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Phase IV, indoor air quality investigation, Livingston Rail Yard, Livingston, Montana

PHASE IV INDOOR AIR QUALITY INVESTIGATION
LIVINGSTON RAIL YARD
LIVINGSTON, MONTANA

ENVIROCON, INC.

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PHASE IV INDOOR AIR QUALITY INVESTIGATION
LIVINGSTON RAIL YARD
LIVINGSTON, MONTANA

Submitted to:

Montana Department of Health
and Environmental Sciences
Cogswell Building
Helena, Montana 59620

Submitted by:

Burlington Northern Railroad Company
9401 Indian Creek Parkway
Overland Park, Kansas 66201

Prepared by:

Envirocon, Inc.
101 International Way
P.O. Box 8243
Missoula, Montana 59807

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TABLE OF CONTENTS

1.0 INTRODUCTION 1
2.0 DESCRIPTION OF FIELD ACTIVITIES 2

2.1 Passive-Dosimeter-Badge Methodology 3
2.2 Berkeley Multisorbent-Tube Methodology 4
2.3 Comparison of Sampling Methodologies 5
2.4 Building-Structure and House-Activity Information 5

3.0 ANALYTICAL RESULTS 6

3.1 Ambient-Air Sampling Results 6
3.2 Indoor-Air Sampling Results 12

3.2.1 Northeast Study Area 13
3.2.2 Southeast Study Area 17

4.0 DATA VALIDATION 19

4.1 Holding Times 19
4.2 Blanks 19
4.3 Duplicates 20
4.4 Measurements and Log Entries 20

5.0 CONCLUSIONS 21

LIST OF APPENDICES

Appendix A - Field-Activity Documents
Appendix B - Data on Standardizing Sampled Air Volumes
Appendix C - Analytical Results
Appendix D - Quality-Control Information

LIST OF FIGURES

1.0 Phase IV Sampling Locations

LIST OF TABLES

1.0 Phase IV Sample Results
2.0 Meteorological Data
3.0 Summary Statistics of Phase IV Indoor-Air Investigation

1.0 INTRODUCTION

The Phase IV indoor-air investigation was conducted by Envirocon, Inc., representing Burlington Northern Railroad Co. (BNRR), at residences near the Livingston Rail Yard (LRY), in Livingston, Montana. This report summarizes the data collected during the Phase IV indoor-air investigation. The investigation was conducted in accordance with a work plan submitted to the Montana Department of Health and Environmental Sciences (MDHES) dated October 21, 1992 (Envirocon, 1992a). The investigation was conducted to evaluate sources and concentrations of tetrachloroethene (PCE) in residences adjacent to the LRY.

Envirocon, representing BNRR, completed three previous indoor-air investigations. The investigations were conducted to evaluate the possible contribution of volatile organic compounds originating from the LRY via ground water and soil gas. Phase I involved a review and summary of all indoor-air and soil-gas data collected through January 1991. Phase I concluded that there was not an imminent threat to public health and that any further investigations should be conducted as part of the health risk assessment (HRA).

The Phase II investigation was conducted as part of the HRA following MDHES' selection of Camp Dresser & McKee (CDM) in January 1992 to conduct the HRA. Phase II investigation results indicated that PCE is ubiquitous and was detected in every sample, including residences located in a background study area. The Phase II investigation concluded that the residences sampled in the northeast study area had concentrations of PCE at above-background concentrations. However, based upon a preliminary risk assessment, immediate remedial actions additional to source-control measures being conducted on-site were not recommended.

The Phase III investigation was conducted to evaluate two different sampling methodologies and to evaluate baseline concentrations of PCE in three homes which MDHES selected for test ventilation systems. The Phase III investigation report (Envirocon, 1992b) recommended the use of passive dosimeters for the Phase IV investigation and established PCE concentrations in three residences prior to the installation and operation of the test ventilation systems.

The primary objective of the Phase IV investigation was to evaluate the sources and concentrations of PCE in residences adjacent the LRY. Both conventional residences with basements and crawlspaces and mobile trailer homes were investigated. Residences with cement slab foundations were excluded from the investigation, because of the impermeable nature of a cement slab. Living areas and all basements were sampled. Crawlspaces were evaluated, and some were excluded because of low frequency of occupancy. The residences were located both north and south of the LRY in two distinct study areas termed the northeast and southeast study areas.

A secondary objective of the Phase IV investigation was to measure concentrations of PCE in the living space of a single residence in which MDHES installed and operated a test ventilation system. MDHES installed one of the three originally proposed test ventilation systems.

2.0 DESCRIPTION OF FIELD ACTIVITIES

The Phase IV investigation was conducted during January and February of 1993. The investigation was conducted in accordance with the Phase IV work plan, which was approved by MDHES on October 19, 1992. MDHES solicited interested residents with crawlspaces or basements living within the identified study areas to contact MDHES regarding indoor air sampling.

MDHES ran an advertisement in the Livingston Enterprise on October 16, 23, and 29, 1992 and allowed interested residents until November 2, 1992 to contact MDHES personnel. In addition, MDHES hand-delivered flyers to all homes within both study areas. Thirty-six homes were identified by MDHES as suitable for indoor air sampling.

In addition, one school and four ambient air locations were sampled in accordance with the Phase IV work plan. The indoor air samples were collected using the 3M passive-dosimeter methodology. The ambient air samples were collected using the Berkeley multisorbent-tube methodology. Indoor air sampling was conducted from January 11 through February 5, 1993. The dosimeters were exposed to indoor air for a minimum of two weeks. Ambient air sampling was conducted for four hours on January 27, 1993. The following sections describe both sampling and analytical methodologies.

2.1 Passive-Dosimeter-Badge Methodology

Passive-dosimeter sampling is based upon the molecular diffusion of vapor-phase compounds onto a thin charcoal sorbent pad. 3-M's passive-dosimeter-badge OVM No. 3500 was used for this sampling methodology. In the field, the dosimeter-badge container was opened and the badge was placed in an appropriate sampling location where indoor air currents were minimal. To attain detection levels of 5.0 micrograms/cubic meter (ug/m^3), the dosimeter was left in place for two weeks. At the end of the sampling period, the dosimeter was capped, placed in its original container, and sent to Energy Laboratories Inc. with the chain-of-custody form.

For passive dosimeters, a diffusion coefficient specific to each analyte is used to calculate indoor air concentrations. The diffusion coefficient for PCE was determined from empirical data. The uptake or sampling rate is calculated by multiplying the diffusion coefficient by the diffusion path length. 3-M's passive-dosimeter-badge OVM No. 3500 has a 1 cm path length and a diffusion coefficient of 28.3 squared centimeters per second (cm^2/sec). These factors combine to result in a sampling rate of 28.3 cm^3/sec.

Analyses of the passive dosimeters were performed by Energy Laboratories, Inc. of Billings, Montana, using National Institute of Occupational Safety and Health (NIOSH) physical and analytical Method 127. This analytical method includes desorption, using carbon disulfide, and gas chromatography (GC), using a flame-ionization detector (FID). Detections were verified by GC mass spectrometry (MS).

2.2 Berkeley Multisorbent-Tube Methodology

The Berkeley multisorbent-tube methodology involves passing a measured volume of air through a sampler which collects the volatile organic compounds (VOCs) on carbon and tenax. The Berkeley methodology and detection limit used were consistent with those described in the Phase II report (Envirocon, 1992c).

A flow rate of 12.5 milliliters/minute was used, resulting in a sampled air volume of approximately 3 liters over a four-hour sampling period. PCE was the target analyte, as discussed above. The target detection limit was 2.0 ug/m^3; the attained detection limit was 0.2 ug/m^3.

The multisorbent tubes were analyzed by Berkeley Analytical using thermal desorption, GC, and MS. This analytical methodology is described in detail in the Phase II report.

2.3 Comparison of Sampling Methodologies

One of the primary objectives of the Phase III investigation was to compare the two sampling methodologies. Six sample locations in three residences were sampled with both methodologies. As discussed in the Phase III report, statistical analyses of the data collected during Phase III indicate:

> "concentrations of PCE measured with passive dosimeters are twice those measured with the Berkeley multisorbent-tube methodology."

Envirocon recommended the passive-dosimeter methodology over the Berkeley multisorbent-tube methodology for the Phase IV investigation. Even though the dosimeter produces qualitative results, the dosimeter collects a more representative sample over an extended period of time.

2.4 Building-Structure and House-Activity Information

Building-structure surveys and house-activity forms were completed by the field sampling team, with assistance from each resident. Copies of the completed forms are included in Appendix A. The building-structure survey includes information on the type and size of each residence's basement and/or crawlspace, the type of heating system, and chemicals stored in each home. The house-activity form includes information on possible sources of organic chemicals in the home that may increase PCE detections.

3.0 ANALYTICAL RESULTS

This section summarizes and interprets the analytical results for the Phase IV investigation. Analytical results for the primary samples are summarized on Table 1.0. Measurements used to compute standard sampled air volumes and correction factors are presented in Appendix B. Laboratory reports are presented in Appendix C. Quality-Control information is presented in Appendix D.

3.1 Ambient-Air Sampling Results

Four ambient air samples were collected using the Berkeley multisorbent-tube methodology. The samples were collected on January 27, 1993 during the range of average wind direction and speed shown on Table 2.0. Wind speeds averaged 16 miles per hour (mph) and the wind direction averaged 223 degrees (southwest). All samples were collected at an elevation of approximately 6 feet at the locations shown of Figure 1.0.

Three ambient air samples were collected upwind from the LRY, as shown on Figure 1.0. Sample AMB-1 was collected 100 yards west of the Yellowstone Motor Inn, on Park Street. This sample was collected to evaluate ambient PCE concentrations upwind from the Livingston business district. PCE concentrations were not measured above the 0.2-ug/m^3 detection limit. This indicates that on January 27, ambient air upwind from the Livingston business district contained PCE concentrations below 0.2 ug/m^3.

Sample AMB-2 was collected at 420 E. Lewis Street, as shown on Figure 1.0. This location is approximately 50 yards upwind from the East Side School and downwind from the Livingston business district. This sample was collected to evaluate ambient PCE concentrations downwind from the

Table 1.0
PHASE IV SAMPLE RESULTS

LOCATION	SAMPLE NO.	UPSTAIRS/ BASEMENT	PCE Concentraton [ug/M^3]	METHOD	SAMPLING DATES
AMB-1	# 103		< 0.2	Berkeley	1/27/1993 (1/15 to 2/5)
AMB-2	# 008		10.2	Berkeley	1/27/1993 (1/15 to 2/5)
AMB-3	# 032		4.7	Berkeley	1/27/1993 (1/15 to 2/5)
AMB-4	# 118		1.0	Berkeley	1/27/1993 (1/15 to 2/5)
NE-2	WK 4798	upstairs	<2.7	passive dos.	1/14 to 2/5
NE-2	WK 4861	basement	8.5	passive dos.	
NE-6	WK 4749	upstairs	< 4.2	passive dos.	1/13 to 1/27
NE-6	WK 4199	basement	< 4.2	passive dos.	
NE-7	WK 4476	upstairs	< 4.2	passive dos.	1/12 to 1/26
NE-7	WK 4581	basement	< 4.2	passive dos.	
NE-8	WK 4850	upstairs	< 4.5	passive dos.	1/12 to 1/26
NE-9	WK 4786	upstairs	< 4.2	passive dos.	1/12 to 1/26
NE-9	WK 4698	dirt dugout	< 4.2	passive dos.	
NE-10	WD 6096	upstairs	< 4.2	passive dos.	1/12 to 1/26
NE-10	WD 6060	dirt dugout	17.4*	passive dos.	
NE-11	WD 5788	upstairs	< 4.2	passive dos.	1/11 to 1/25
NE-12	WK 4500	upstairs	< 4.2	passive dos.	1/12 to 1/26
NE-12	WK 4661	basement	< 4.2	passive dos.	
NE-13	WK 4474	upstairs	< 4.2	passive dos.	1/12 to 1/26
NE-13	WK 4510	basement	< 4.2	passive dos.	
NE-14	WK4218	trailer	< 4.2	passive dos.	1/13 to 1/27
NE-14	WK 4195	skirting	< 4.2	passive dos.	
NE-15	WK 4662	upstairs	< 4.2	passive dos.	1/13 to 1/27
NE-15	WK 4632	basement	< 4.2	passive dos.	
NE-16	WK 4695	upstairs	19.0	passive dos.	1/12 to 1/26
NE-16	WK 4818	basement	14.0	passive dos.	
NE-17	WK 4651	upstairs	10.0	passive dos.	1/13 to 1/27
NE-17	WK 4445	basement	18.9	passive dos.	
NE-18	WK 4422	upstairs	< 4.2	passive dos.	1/12 to 1/26
NE-18	WK 4536	basement	< 4.2	passive dos.	
NE-19	WK 4755	upstairs	< 4.2	passive dos.	1/12 to 1/26
NE-20	WK 4857	upstairs	8.7	passive dos.	1/22 to 2/5
NE-20	WK 4683	dirt dugout	8.2	passive dos.	
SE-5	WK 4847	upstairs	< 4.2	passive dos.	1/12 to 1/26
SE-5	WK 4682	crawlspace	5.2	passive dos.	
SE-10	WK 4833	upstairs	< 4.2	passive dos.	1/13 to 1/27
SE-10	WK 4828	basement	< 4.2	passive dos.	
SE-11	WK 4245	upstairs	< 4.5	passive dos.	1/13 to 1/26
SE-11	WK 4181	basement	< 4.5	passive dos.	
SE-12	WD 5991	upstairs	< 4.2	passive dos.	1/11 to 1/25
SE-12	WD 5847	basement	< 4.2	passive dos.	

Table 1.0
PHASE IV SAMPLE RESULTS

LOCATION	SAMPLE NO.	UPSTAIRS/ BASEMENT	PCE Concentraton [ug/M^3]	METHOD	SAMPLING DATES
SE-14	WK 4573	upstairs	< 4.2	passive dos.	1/12 to 1/26
SE-14	WK 4423	basement	< 4.2	passive dos.	
SE-15	WD 6221	split level-up	< 4.2	passive dos.	1/11 to 1/25
SE-15	WD 6111	basement	< 4.2	passive dos.	
SE-16	WK 4750	upstairs	< 4.2	passive dos.	1/12 to 1/26
SE-17	WK 4649	upstairs	4.5	passive dos.	1/13 to 1/26
SE-17	WK 4878	crawlspace	5.0	passive dos.	
SE-18	WD 5757	upstairs	15.7	passive dos.	1/11 to 1/25
SE-18	WD 6203	crawlspace	< 4.2	passive dos.	
SE-19	WK 4671	upstairs	< 4.2	passive dos.	1/12 to 1/26
SE-19	WK 4589	crawlspace	< 4.2	passive dos.	
SE-20	WK 4827	upstairs	< 4.2	passive dos.	1/13 to 1/27
SE-21	WD 6092	upstairs	< 4.2	passive dos.	1/11 to 1/25
SE-22	WK 4438	trailer	<4.5	passive dos.	1/13 to 1/26
SE-23	WK 4168	upstairs	< 4.2	passive dos.	1/13 to 1/27
SE-24	WK 4600	upstairs	6.8	passive dos.	1/12 to 1/26
SE-24	WK 4593	crawlspace	< 4.2	passive dos.	
SE-25	WK 4635	upstairs	< 4.2	passive dos.	1/12 to 1/26
SE-26	WK 4242	upstairs	< 4.5	passive dos.	1/13 to 1/26
SE-26	WK 4303	crawlspace	< 4.5	passive dos.	
SE-27	WK 4456	upstairs	< 4.2	passive dos.	1/12 to 1/26
SE-27	WK 4766	basement	< 4.2	passive dos.	
SE-28	WK 4688	upstairs	< 4.2	passive dos.	1/13 to 1/27
SE-28	WK 4831	crawlspace	< 4.2	passive dos.	
SE-29	WK 4606	trailer	< 4.2	passive dos.	1/13 to 1/27

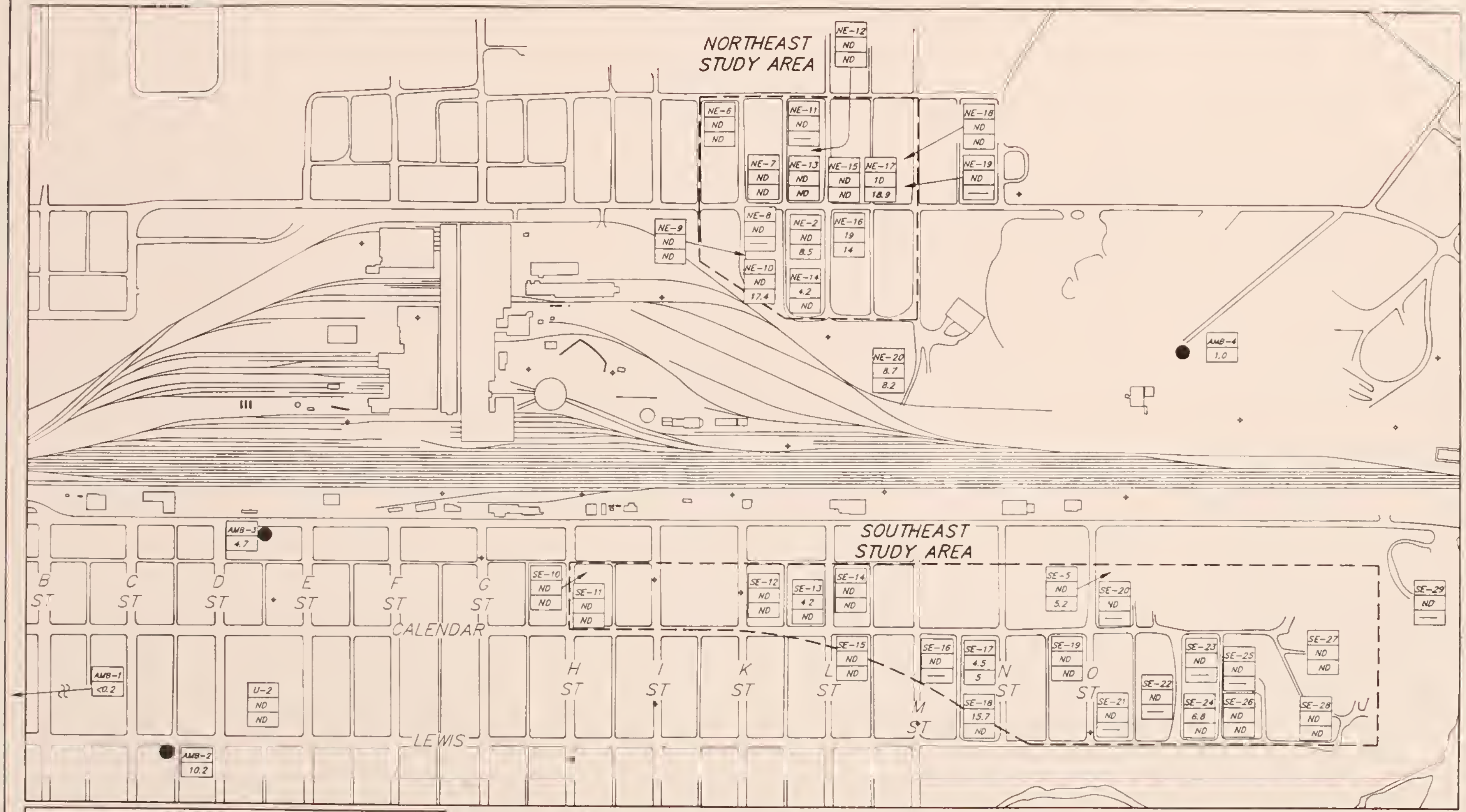
U-2	WK 4721	upstairs	< 4.2	passive dos.	1/12 to 1/26
U-2	WK 4641	basement	< 4.2	passive dos.	

Table 2.0

METEOROLOGICAL DATA
JANUARY 27, 1993 BETWEEN 11 a.m. and 3 p.m.

Time	Wind Direction [degrees]	Average Wind Speed [miles/hour]	Maximum Wind Speed [miles/hour]
1100	200	11.3	20
1200	270	14.8	24
1300	240	16.5	26
1400	250	13.9	23
1500	230	17.4	26
Average:	238	14.8	
January, 1992 **Average:**	223	16.1	

* As measured at Mission Field, Livingston



LEGEND

SE-17 — LOCATION
4.5 — UPSTAIRS
5 — BASEMENT/CRAWLSPACE

● AMBIENT AIR SAMPLE LOCATIONS

N

0 400'
SCALE IN FEET

BURLINGTON NORTHERN

ENVIROCON, INC.

LIVINGSTON RAILYARD
INDOOR AIR INVESTIGATION

PHASE IV

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FIGURE 1.0

Livingston business district and upwind from the LRY. A PCE concentration of 10.2 ug/m^3 was detected in this sample. This indicates that on January 27, ambient air in the general area of the East Side School was affected by PCE sources unrelated to the LRY.

AMB-3 was collected at 450 E. Park Street, which is also downwind from the Livingston business district and upwind from the LRY (Figure 1.0). A PCE concentration of 4.7 ug/m^3 was detected. This sample also indicates that on January 27, ambient air in the general area upwind from the LRY was affected by PCE sources unrelated to the LRY.

The downwind ambient air sample (AMB-4) was collected 100 yards northeast of the old Forest Products Building, as shown on Figure 1.0. This sample was collected to evaluate PCE concentrations downwind from both the town of Livingston and the LRY. A PCE concentration of 1.0 ug/m^3 was detected. This is more than one order of magnitude smaller than the 10.2 ug/m$_3$ detected in AMB-2. This indicates that the LRY is not a significant source of PCE to ambient air. It also indicates that PCE concentrations decrease with distance downwind from the Livingston business district.

The results indicate that the LRY is a not a significant source of PCE to ambient air. The ambient air sample results demonstrate that there are significant PCE sources within the Livingston business district that are unrelated to the LRY. As discussed in the Phase II report, studies conducted by the Environmental Protection Agency indicate that detectable concentrations of PCE are common in ambient air, particularly in urban areas.

Passive-dosimeter samples were also collected at the same ambient locations to evaluate ambient air quality over extended time periods. These samples were not required by the Phase IV work plan. The badges were

placed inside inverted tin cans, which were attached to telephone poles at approximately 12 feet high. Each can lid, when replaced, contained approximately five nail holes to provide ventilation.

No PCE was detected in the four passive-dosimeter samples above the 2.0-ug/m^3 detection limit. These dosimeter results do not compare well with the Berkeley multisorbent-tube results. Envirocon believes that the openings in the can lids were not adequate to allow sufficient air exchange around the dosimeter. Results from the Phase III investigation indicate that dosimeter PCE measurements are twice as high as collocated Berkeley multisorbent-tube PCE measurements.

3.2 Indoor-Air Sampling Results

Sixty-eight samples were collected from 36 residences, including six duplicates. The 36 residences were located in two study areas, as shown on Figure 1.0. Of the 36 residences sampled, 15 contained crawlspaces, 15 contained cement basements, three contained earthen basements, and three were mobile trailers (Table 1.0).

Of the 36 residences sampled, nine contained detectable concentrations of PCE. Of the nine residences in which PCE was detected, five contained PCE concentrations below the detected ambient concentration of 10.2 ug/m^3. Based upon a statistical evaluation of the Phase III investigative results, a relationship was established which indicated that PCE concentrations measured with passive dosimeters are twice those measured with the collocated Berkeley multisorbent tubes.

A statistical evaluation of the Phase IV results was conducted to evaluate trends. As shown on Table 3.0, comparisons were made of PCE concentrations at locations with different foundation types, PCE concentrations upstairs versus basements and crawlspaces, and PCE concentrations of the northeast study area versus the southeast study area. The following are interpretations based upon the statistical evaluation:

1. There is no statistically significant difference between mean PCE concentrations upstairs in houses and mean PCE concentrations in crawlspaces and basements.

2. There is no statistically significant difference between mean PCE concentrations in residences with concrete basements, earthen-floor basements, and crawlspaces.

3. There is no statistically significant difference between mean PCE concentrations in the southeast and northeast study areas.

4. There is no statistically significant difference between mean PCE concentrations in houses versus in the ambient air.

The following two sections interpret PCE detections in each residence for both study areas.

3.2.1 Northeast Study Area

Sixteen residences were sampled in the northeast study area. Of these 16 residences, three were homes with crawlspaces, one was a mobile trailer home, nine were homes with cement basements, and three were homes with earthen dugout basements.

Table 3.0 Summary Statistics for Phase IV Indoor Air Investigation

Chemical Analyte: *Tetrachloroethene* Units: *ug/m3*

Composite Location Description	Min	Max	2nd Max	Arithmethic Mean	Arithmethic Upper 95% CI	Geometric Mean	Geometric Upper 95% CI	95th Percentile	Total Number of Results	Number of BDL Results
Ambient Air Monitoring Stations	0.1	10.2	4.7	4.0	11.2	1.4	37.9	10.2	4	1
All Sites - Upstairs Results	1.3	19.0	15.7	3.5	4.8	2.6	3.3	10.0	36	30
All Sites - Basement Results	2.1	18.9	17.4	4.5	6.4	3.1	4.3	17.4	26	19
All SE Sites - Upstairs Results	2.1	15.7	6.8	3.1	4.6	2.5	3.2	6.8	20	17
All SE Sites - Basement Results	2.1	5.2	5.0	2.5	3.1	2.4	2.8	5.0	14	12
All NE Sites - Upstairs Results	1.3	19.0	10.0	4.0	6.5	2.8	4.1	10.0	16	13
All NE Sites - Basement Results	2.1	18.9	17.4	6.4	10.3	4.1	7.3	17.4	13	8
NE & SE with Cement Basement - Upstairs Results	1.3	19.0	10.0	3.7	6.3	2.6	3.8	10.0	15	13
NE & SE with Cement Basement - Basement Results	2.1	18.9	14.0	4.4	7.3	3.0	4.6	14.0	15	12
SE with Cement Basement - Upstairs Results	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.2	6	6
SE with Cement Basement - Basement Results	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.2	6	6
SE with Crawlspace - Upstairs Results	2.1	15.7	6.8	3.8	6.3	2.9	4.4	6.8	12	9

Note: Statistics generated from composite of results for sites meeting description provided.
NE - Northeast study area homes, SE - Southeast study area homes.
BDL results were multiplied by a factor of 0.50 BDL - Below Detection Limit, CI - Confidence Interval for Mean

Table 3.0 (continued) Summary Statistics for Phase IV Indoor Air Investigation

Chemical Analyte: *Tetrachloroethene* Units: *ug/m3*

				Arithmethic		Geometric				
Composite Location Description	Min	Max	2nd Max	Mean	Upper 95% CI	Mean	Upper 95% CI	95th Percentile	Total Number of Results	Number of BDL Results
SE with Crawlspace - Crawlspace Results	2.1	5.2	5.0	2.9	4.3	2.7	4.0	5.2	7	5
NE with Cement Basement - Upstairs Results	1.3	19.0	10.0	4.7	9.3	3.0	5.9	19.0	9	7
NE with Cement Basement - Basement Results	2.1	18.9	14.0	6.0	10.9	3.8	7.9	18.9	9	6
NE with Crawlspace - Upstairs Results	2.1	2.2	2.1	2.1	2.3	2.1	2.3	2.2	3	3
NE with Earthen Dugout Basement - Upstairs Results	2.1	8.7	2.1	4.3	13.7	3.3	25.9	8.7	3	2
NE with Earthen Dugout Basement - Basement Results	2.1	17.4	8.2	9.2	28.3	6.6	95.9	17.4	3	1

Note: Statistics generated from composite of results for sites meeting description provided.
NE - Northeast study area homes, SE - Southeast study area homes.
BDL results were multiplied by a factor of 0.50 BDL - Below Detection Limit, CI - Confidence Interval for Mean

No PCE was detected in any of the three residences with crawlspaces or in the mobile trailer home. Of the nine residences with cement basements, PCE was detected in three. One of the three residences (NE-16) contained PCE concentrations that were higher upstairs than in the basement. The other two residences (NE-2 and NE-17) contained PCE concentrations that were higher in the basement than upstairs. This inverse relationship indicates a source of PCE (via ground water) unrelated to the LRY .

NE-16 contained 19 ug/m^3 of PCE upstairs and 14 ug/m^3 of PCE in the basement. One of the residents is employed as an automobile mechanic. The building-structure survey states that paint thinner is stored in the basement. The House-activity form indicates that varnish was applied in the residence during the week before sampling.

NE-2 contained <2.7 ug/m^3 of PCE upstairs and 8.5 ug/m^3 of PCE in the basement. The residence was under construction and was not inhabited. The building-structure survey states that paint, paint thinner, PVC cement, and mineral spirits are stored in the basement.

NE-17 contained 10.0 ug/m^3 of PCE upstairs and 18.9 ug/m^3 of PCE in the basement. A duplicate sample, collected in the basement, contained a PCE concentration of 20.0 ug/m^3. One of the residents of NE-17 is employed as a school-bus mechanic. Also, the house-activity form states that "Lift-Off," a spot cleaner containing chlorinated solvents, is used and stored in the residence. As shown on Figure 1.0, NE-17 is located 700 feet from the LRY boundary. Several homes with similar cement foundations (NE-7, NE-13, and NE-15) are closer to the LRY and do not contain detectable indoor PCE concentrations. In addition, a residence with a more permeable earthen foundation (NE-9) is between NE-17 and the LRY, and it does not contain detectable indoor PCE concentrations. Therefore, the PCE detections in NE-17, which were the

highest detected during the Phase IV study, are most likely due to PCE sources within the house.

Of the three residences in the northeast study area with earthen basements, PCE was detected in two residences. One of the two residences contained PCE concentrations that were higher upstairs than in the basement (NE-20). The other residence (NE-10) contained PCE concentrations that were higher in the basement than upstairs. The house activity form indicates that no time is spent in the basement.

NE-20 is a mobile trailer home placed above an earthen dugout basement. The residence contained 8.7 ug/m^3 of PCE upstairs and 8.2 ug/m^3 of PCE in the basement. The House-activity form indicates that carpet cleaners and room deodorizers are used. The form also indicates that no time is spent in the basement.

NE-10 contained <4.2 ug/m^3 of PCE upstairs and 17.4 ug/m^3 of PCE in the basement. This residence contains a dugout basement which is not occupied.

3.2.2 Southeast Study Area

Twenty residences were sampled in the southeast study area. Of these 20 residences, 12 had crawlspaces, two were mobile trailer homes, and six had cement basements. No residences sampled in the southeast study area had earthen dugout basements.

Of the 12 residences with earthen crawlspaces, seven crawlspaces were sampled, and PCE was detected in four. Two of the four residences contained PCE concentrations that were higher upstairs than in the crawlspace (SE-18

and SE-24). The other two residences (SE-5 and SE-17) contained PCE concentrations that were higher in the crawlspace than upstairs. Of the five residences where the crawlspaces were not sampled, no PCE was detected within the house.

SE-18 contained 15.7 ug/m^3 of PCE upstairs and <4.2 ug/m^3 of PCE in the crawlspace. The resident is employed as an automobile body repairman. The building-structure survey states that painting occurred during the week before sampling.

SE-24 contained 6.8 ug/m^3 of PCE upstairs and <4.2 ug/m^3 of PCE in the crawlspace. One of the residents is employed by a local dry-cleaner establishment. A second resident is a locomotive and automobile painter.

SE-5 was sampled during Phases II, III, and IV. Phase III sampling was conducted to evaluate PCE concentrations prior to the installation and operation of a test ventilation system. Passive-dosimeter PCE detections for two-week-duration samples collected in November 1992 were 18 ug/m^3, upstairs, and 49 ug/m^3, in the crawlspace. After operating the test ventilation system for one month, Phase IV sampling indicated <4.2 ug/m^3 of PCE upstairs and 5.2 ug/m^3 of PCE in the crawlspace.

SE-17 contained 4.5 ug/m^3 of PCE upstairs and 5.0 ug/m^3 of PCE in the crawlspace. A duplicate sample was collected in the crawlspace, and it also contained 4.5 ug/m^3 of PCE. The house-activity form states that insect repellents and linoleum sprays containing chlorinated solvents are stored in the home.

4.0 DATA VALIDATION

The analytical results were validated by evaluating the following:

- Holding times;
- Comparison with field and system blanks;
- Comparison with field duplicate results; and
- Field measurements and field log entries.

4.1 Holding Times

All multisorbent-tube samples were analyzed within six days and all passive dosimeters were analyzed within three days. These holding times are within limits specified in the Phase II report.

4.2 Blanks

Two Berkeley multisorbent-tube blanks were analyzed: one lab blank, or system blank, and one field blank (No. 065). The PCE mass in both blanks was below the detection limit of 0.5 nanograms/tube.

Two different series or "lots" of passive-dosimeter badges were sampled and analyzed: 10 badges from the "WD" series and 64 badges from the "WK" series. Two field blanks (WK 4805 and WK 4763) and one lab blank (WK 4311) were analyzed, all from the WK series. The PCE mass for all three blanks was below the detection limit of 2.5 micrograms/dosimeter. Due to an oversight, no WD blank was analyzed. However, eight of the primary WD samplers contained less than 2.5 micrograms, per badge, of PCE. In spite of the fact that these eight badges were not sampled as blanks, they are sufficient evidence of the integrity of the WD badge lot.

All multisorbent-tube and passive-dosimeter-badge blank analyses are acceptable. Blank sample results are presented on Table D-1, in Appendix D.

4.3 Duplicates

One valid PCE multisorbent duplicate/primary set and six valid passive-dosimeter duplicate sets were obtained.

Multisorbent-tube field duplicates were collected at the ambient-air location AMB-3. The relative percent difference (RPD) was 2 percent.

Dosimeter duplicate-sample pairs were collected upstairs at NE-9, SE-5, SE-17, and SE-29 and downstairs at NE-17 and SE-27. The RPDs were 6 percent or less.

The RPDs between primary and duplicate samples are presented on Table D-2, in Appendix D. All duplicate-pair RPDs are acceptable for both multisorbent tubes and passive-dosimeter badges.

4.4 Measurements and Log Entries

No problems were revealed when the field measurements and field log entries were examined. The five multisorbent-tube samplers presented for analysis had pre- and post-calibration flow rates within 11 percent, with only one flow-rate difference being greater than 10 percent. These differences are within the acceptable range.

An analysis of the sample results, including holding times, blank and duplicate sample results, field measurements, and log entries, indicates that all sample results are valid.

Berkeley Analytical's quality assurance program for the analysis of VOCs can be found in the Phase II report. Quality control information, including narrative reports from both Berkeley Analytical Associates and Energy Laboratories, Inc., are included in Appendix D.

5.0 CONCLUSIONS

The data collected during the Phase IV investigation indicate that there are significant sources of ambient PCE in Livingston that are unrelated to the LRY. Ambient air sampling indicates that PCE concentrations downwind from the Livingston business district were four to ten times larger than PCE concentrations immediately downwind of the LRY.

A majority of the residences which contained detectable PCE had concentrations similar to ambient PCE concentrations. Most of the residences which contained PCE concentrations above ambient concentrations contained other potential sources of PCE unrelated to the LRY. These unrelated sources include household products which contain PCE or residents working at jobs where products containing PCE are likely to be used.

Based upon the Phase IV investigation, no immediate remedial actions are warranted other than the source control activities presently in operation at the LRY. The source control activities presently operating include soil vapor extraction and removal/off-site disposal of the sludge. Ground water monitoring results indicate that PCE concentrations in ground water are decreasing with time (Envirocon, 1992d).

BNRR requests that MDHES direct CDM to re-evaluate the risks associated with the indoor-air potential-exposure pathway. The previous calculations are based upon data which are no longer current.

REFERENCES

Envirocon, 1992a, Second Indoor Air Work Plan for the Livingston Rail Yard Project: prepared for Burlington Northern Railroad. Envirocon, Inc., October 21, 1992.

Envirocon, 1992b, Phase III Indoor Air Quality Investigation Report: prepared for Burlington Northern Railroad. Envirocon, Inc., December 7, 1992.

Envirocon, 1992c, Livingston Rail Yard Indoor Air Quality Investigation Report: prepared for Burlington Northern Railroad. Envirocon, Inc., March 27, 1992.

Envirocon, 1992d, Draft Final Livingston Rail Yard Remedial Investigation Report: prepared for Burlington Northern Railroad. Envirocon, Inc., November 10, 1992.

APPENDIX A

FIELD-ACTIVITY DOCUMENTS

ENVIROCON, INC.

101 INTERNATIONAL WAY
POST OFFICE BOX 8243
MISSOULA, MONTANA 59807
TELEPHONE: (406) 523-1150
FAX: (406) 523-1182

ENVIROCON, INC.

Building-Structure Survey

Address: SE-5

Date: 10-19-92

1. Approximately how many square feet does your basement cover? 570

2. Please indicate the type of floor your basement has.

   ___ Cement
   X Bare earth
   ___ Cinderblock
   ___ Other (please describe) ___

3. Does your basement have any openings to the outside air other than the door leading to the rest of the house? [✓ Yes] No If yes, please describe. 2. 4. [illegible]

4. Approximately how many hours a week do you spend in your basement? No

5. Are there any cans of paint, paint thinner, gasoline or other solvents being stored in your basement? If yes, please describe. No

6. Have you ever noticed any odors in your basement that you could not explain by the material you have stored there or by activities in the rest of the house? If so, please describe.

7. Does your house have a crawl space? [✓ Yes] No

8. If you do have a crawl space, approximately how many square feet does it cover? 570

9. Does your household use natural gas for cooking? Yes [✓ No]

10. Please indicate the type of heating system you use.

    Forced-air natural gas
    Natural gas heaters
    Electric
    [✓ Wood]
    Other ___

11. Please list the number of first-floor rooms in your house. 5
    The approximate square footage of these rooms is [illegible]

ENVIROCON, INC.

101 INTERNATIONAL WAY
POST OFFICE BOX 8243
MISSOULA MONTANA 59807
TELEPHONE (406) 523-1150
FAX (406) 523-1182

ENVIROCON, INC.

Building-Structure Survey

Address: SE-10

Name of person completing this form: J. Michaletz

Date: 1/13/93

1. Approximately how many square feet does your basement cover? 1000 $ft.^2$

2. Please indicate the type of floor your basement has.

   ✓ Cement - some exposed earth
   ✓ Bare earth
   ___ Cinderblock
   ___ Other (please describe) ________

3. Does your basement have any openings to the outside air other than the door leading to the rest of the house? [✓ Yes] No If yes, please describe.

4. Approximately how many hours a week do you spend in your basement? 10 min. /mo.

5. Are there any cans of paint, paint thinner, gasoline or other solvents being stored in your basement? If yes, please describe. N

6. Have you ever noticed any odors in your basement that you could not explain by the material you have stored there or by activities in the rest of the house? If so, please describe. N

7. Does your house have a crawl space? Yes [✓ No]

8. If you do have a ~~crawl space,~~ approximately how many square feet does it cover? ________

9. Does your household use natural gas for cooking? Yes [✓ No] Electric

10. Please indicate the type of heating system you use.

    [✓ Forced-air natural gas]
    Natural gas heaters
    Electric
    Wood
    Other ________

11. Please list the number of first-floor rooms in your house. 7
    The approximate square footage of these rooms is 1250 $ft.^2$

ENVIROCON, INC.

101 INTERNATIONAL WAY
POST OFFICE BOX 8243
MISSOULA MONTANA 59807
TELEPHONE (406) 523-1150
FAX (406) 523-1182

House-Activity Form

ENVIROCON, INC.

We are interested in recording any activity which would release solvent vapor into the air while this test is being performed. Please check off any activity which applies to your household during the sampling period. In order for your house to be sampled, you must refrain from engaging in any of these activities for one day prior to air sampling.

Resident's Name SE 10

Address [illegible]

Dates of Sampling 1/13/93

Painting or furniture-stripping during the past week		N
Smoking		N
Deep fat frying		Y
Using dry-cleaning fluid		N
Bringing dry-cleaned clothes into the house during the past week		N
Using furniture, floor, or leather polishes	Common household cleaners	N
Using carpet cleaner	Some Aerosol	N
Using room deodorizers		N
Using airplane glue or other glues	Super Glue	Y
Burning ~~wood~~ or ~~trash~~ in your fireplace		N
Using gasoline, kerosene lamps, or candles		N

Were any windows or doors open for extended periods prior to the sampling event? Yes [✓ No]

ENVIROCON, INC.

101 INTERNATIONAL WAY
POST OFFICE BOX 8243
MISSOULA, MONTANA 59807
TELEPHONE (406) 523-1150
FAX (406) 523-1182

ENVIROCON, INC.

Building-Structure Survey

Address: SE-11

Name of person completing this form: J. Michaletz

Date: 1/13/93

1. Approximately how many square feet does your basement cover? ~~1000~~ 500 ft²

2. Please indicate the type of floor your basement has.

   ✓ Cement
   ___ Bare earth
   ___ Cinderblock
   ___ Other (please describe) ______

3. Does your basement have any openings to the outside air other than the door leading to the rest of the house? [✓ Yes] No If yes, please describe.

4. Approximately how many hours a week do you spend in your basement? 1 Bedroom Laundry Room

5. Are there any cans of paint, paint thinner, gasoline or other solvents being stored in your basement? If yes, please describe.

6. Have you ever noticed any odors in your basement that you could not explain by the material you have stored there or by activities in the rest of the house? If so, please describe. Furnace-related (gas) odor

7. Does your house have a crawl space? Yes [✓ No]

8. If you do have a crawl space, approximately how many square feet does it cover? ______

9. Does your household use natural gas for cooking? Yes [✓ No] Electric

10. Please indicate the type of heating system you use.

   [✓ Forced-air natural gas]
   Natural gas heaters
   Electric
   Wood
   Other ______

11. Please list the number of first-floor rooms in your house. 3-4
    The approximate square footage of these rooms is 1000 ft²

ENVIROCON, INC.

101 INTERNATIONAL WAY
POST OFFICE BOX 8243
MISSOULA, MONTANA 59807
TELEPHONE (406) 523-1150
FAX (406) 523-1182

ENVIROCON, INC.

House-Activity Form

We are interested in recording any activity which would release solvent vapor into the air while this test is being performed. Please check off any activity which applies to your household during the sampling period. In order for your house to be sampled, you must refrain from engaging in any of these activities for one day prior to air sampling.

Resident's Name SE - 11

Address

(PETERSON - OWNER)

Dates of Sampling 1/13/93

Painting or furniture-stripping during the past week		N
Smoking		Y
Deep fat frying		N
Using dry-cleaning fluid		N
Bringing dry-cleaned clothes into the house during the past week		N
Using furniture, floor, or leather polishes	Common Household Cleaners	N
Using carpet cleaner		N
Using room deodorizers	(WIZARD SPRAY)	N
Using airplane glue or other glues		N
Burning ~~wood~~ or ~~trash~~ in your fireplace		N
Using gasoline, kerosene lamps, or candles		N

Were any windows or doors open for extended periods prior to the sampling event? Yes [✓ No]

ENVIROCON, INC.

101 INTERNATIONAL WAY
POST OFFICE BOX 8243
MISSOULA, MONTANA 59807
TELEPHONE (406) 523-1150
FAX (406) 523-1182

ENVIROCON, INC.

Building-Structure Survey

Address: SE-12 (VACANT)
Livingston, MT

Date: 1-11-93

1. Approximately how many square feet does your basement cover? 500

2. Please indicate the type of floor your basement has.

   ✓ Cement
   ___ Bare earth
   ___ Cinderblock
   ___ Other (please describe) ___

3. Does your basement have any openings to the outside air other than the door leading to the rest of the house? Yes [✓ No] If yes, please describe.

4. Approximately how many hours a week do you spend in your basement? -0-

5. Are there any cans of paint, paint thinner, gasoline or other solvents being stored in your basement? If yes, please describe. NO

6. Have you ever noticed any odors in your basement that you could not explain by the material you have stored there or by activities in the rest of the house? If so, please describe. NO

7. Does your house have a crawl space? Yes [✓ No]

8. If you do have a crawl space, approximately how many square feet does it cover? ___

9. Does your household use natural gas for cooking? Yes [✓ No]

10. Please indicate the type of heating system you use.

    Forced-air natural gas ✓
    Natural gas heaters
    Electric
    Wood
    Other ___

11. Please list the number of first-floor rooms in your house. 5
    The approximate square footage of these rooms is 1100.

ENVIROCON, INC.

101 INTERNATIONAL WAY
POST OFFICE BOX 8243
MISSOULA MONTANA 59807
TELEPHONE (406) 523-1150
FAX (406) 523-1182

ENVIROCON, INC.

House-Activity Form

We are interested in recording any activity which would release solvent vapor into the air while this test is being performed. Please check off any activity which applies to your household during the sampling period. In order for your house to be sampled, you must refrain from engaging in any of these activities for one day prior to air sampling.

Resident's Name VACANT ( )

Address SE-12
Livingston

Dates of Sampling 1-11-93

Painting or furniture-stripping during the past week	0
Smoking	
Deep fat frying	
Using dry-cleaning fluid	
Bringing dry-cleaned clothes into the house during the past week	
Using furniture, floor, or leather polishes	
Using carpet cleaner	
Using room deodorizers	
Using airplane glue or other glues	
Burning wood or trash in your fireplace	
Using gasoline, kerosene lamps, or candles	

Were any windows or doors open for extended periods prior to the sampling event? Yes [✓ No]

ENVIROCON, INC.

101 INTERNATIONAL WAY
POST OFFICE BOX 8243
MISSOULA, MONTANA 59807
TELEPHONE (406) 523-1150
FAX (406) 523-1182

ENVIROCON, INC.

Building-Structure Survey

Address: SE-14

Name of person completing this form: J Michaletz

Date: 1/12/93

1. Approximately how many square feet does your basement cover? ________

2. Please indicate the type of floor your basement has.

   ✓ Cement
   ____ Bare earth
   ____ Cinderblock
   ____ Other (please describe) ________

3. Does your basement have any openings to the outside air other than the door leading to the rest of the house? [✓ Yes] No If yes, please describe. 3 Windows

4. Approximately how many hours a week do you spend in your basement? 1 hr./week

5. Are there any cans of [✓ paint], paint thinner, gasoline or other solvents being stored in your basement? If yes, please describe. Paint only

6. Have you ever noticed any odors in your basement that you could not explain by the material you have stored there or by activities in the rest of the house? If so, please describe. No

7. Does your house have a crawl space? Yes [✓ No]

8. If you do have a crawl space, approximately how many square feet does it cover? 120 ft.^{2}

9. Does your household use natural gas for cooking? Yes [✓ No] Electric

10. Please indicate the type of heating system you use.

    Forced-air natural gas
    Natural gas heaters
    Electric
    Wood
    Other ________

11. Please list the number of first-floor rooms in your house. 7-8
    The approximate square footage of these rooms is 1000 ft.^{2}

A Washington Company

ENVIROCON, INC.

101 INTERNATIONAL WAY
POST OFFICE BOX 8243
MISSOULA MONTANA 59807
TELEPHONE. (406) 523-1150
FAX: (406) 523-1182

ENVIROCON, INC.

House-Activity Form

We are interested in recording any activity which would release solvent vapor into the air while this test is being performed. Please check off any activity which applies to your household during the sampling period. In order for your house to be sampled, you must refrain from engaging in any of these activities for one day prior to air sampling.

Resident's Name ____________

Address SE-14

Dates of Sampling 1/12/93

Painting or furniture-stripping during the past week	N
Smoking	N
Deep fat frying	N
Using dry-cleaning fluid	N
Bringing dry-cleaned clothes into the house during the past week	N
Using furniture, floor, or leather polishes {Common Household Cleaners Bleach	N
Using carpet cleaner	N
Using room deodorizers	Y
Using airplane glue or other glues (Elmers)	N
Burning wood or trash in your fireplace	N
Using gasoline, kerosene lamps, or candles	N

Were any windows or doors open for extended periods prior to the sampling event? Yes [✓ No]

ENVIROCON, INC.

101 INTERNATIONAL WAY
POST OFFICE BOX 8243
MISSOULA, MONTANA 59807
TELEPHONE (406) 523-1150
FAX (406) 523-1182

ENVIROCON, INC.

Building-Structure Survey

Address: SE-15

Date: 1-11-93

1. Approximately how many square feet does your basement cover? 1500

2. Please indicate the type of floor your basement has.

   - ✓ Cement
   - ___ Bare earth
   - ___ Cinderblock
   - ✓ Other (please describe) split level home

3. Does your basement have any openings to the outside air other than the door leading to the rest of the house? [✓ Yes] No If yes, please describe. split level

4. Approximately how many hours a week do you spend in your basement? 60

5. Are there any cans of paint, paint thinner, gasoline or other solvents being stored in your basement? If [✓ yes] please describe. storage closet

6. Have you ever noticed any odors in your basement that you could not explain by the material you have stored there or by activities in the rest of the house? If so, please describe. no

7. Does your house have a crawl space? Yes [✓ No]

8. If you do have a crawl space, approximately how many square feet does it cover? ______

9. Does your household use natural gas for cooking? Yes [✓ No]

10. Please indicate the type of heating system you use.

    - Forced-air natural gas
    - Natural gas heaters
    - Electric
    - [✓ Wood]
    - Other ______

11. Please list the number of ~~first floor~~ ground floor rooms in your house. 7
    The approximate square footage of these rooms is 1500

ENVIROCON, INC.

101 INTERNATIONAL WAY
POST OFFICE BOX 8243
MISSOULA, MONTANA 59807
TELEPHONE (406) 523-1150
FAX: (406) 523-1182

ENVIROCON, INC.

House-Activity Form

We are interested in recording any activity which would release solvent vapor into the air while this test is being performed. Please check off any activity which applies to your household during the sampling period. In order for your house to be sampled, you must refrain from engaging in any of these activities for one day prior to air sampling.

Resident's Name

Address SE-15

Dates of Sampling 1-11-93

Painting or furniture-stripping during the past week	
Smoking	✓
Deep fat frying	
Using dry-cleaning fluid	
Bringing dry-cleaned clothes into the house during the past week	
Using furniture, floor, or leather polishes	✓
Using carpet cleaner	
Using room deodorizers	✓
Using airplane glue or other glues	
Burning wood or trash in your fireplace	✓
Using gasoline, kerosene lamps, or candles	

Were any windows or doors open for extended periods prior to the sampling event? Yes [✓ No]

ENVIROCON, INC.

101 INTERNATIONAL WAY
POST OFFICE BOX 3243
MISSOULA, MONTANA 59807
TELEPHONE (406) 523-1150
FAX (406) 523-1182

ENVIROCON, INC.

Building-Structure Survey

Address: SE-16

Name of person completing this form: J. Michaletz

Date: 1/12/93

1. Approximately how many square feet does your ~~basement~~ crawlspace cover? ________

2. Please indicate the type of floor your basement has.

   ☐ Cement
   ☑ Bare earth
   ☐ Cinderblock
   ☐ Other (please describe) ____________

3. Does your basement have any openings to the outside air other than the door leading to the rest of the house? [✓ Yes] No If yes, please describe.

4. Approximately how many hours a week do you spend in your basement? One 1/yr.

5. Are there any cans of paint, paint thinner, gasoline or other solvents being stored in your basement? If yes, please describe. No

6. Have you ever noticed any odors in your basement that you could not explain by the material you have stored there or by activities in the rest of the house? If so, please describe. V. Rarely

7. Does your house have a crawl space? [✓ Yes] No

8. If you do have a crawl space, approximately how many square feet does it cover? 600 ft^2

9. Does your household use natural gas for cooking? [✓ Yes] No

10. Please indicate the type of heating system you use.

    ☐ Forced-air natural gas
    ☐ Natural gas heaters
    ☐ Electric baseboard
    ☐ Wood
    ☐ Other ____________

11. Please list the number of first-floor rooms in your house. 7
    The approximate square footage of these rooms is 800 ft^2

ENVIROCON, INC.

101 INTERNATIONAL WAY
POST OFFICE BOX 8243
MISSOULA, MONTANA 59807
TELEPHONE: (406) 523-1150
FAX: (406) 523-1182

ENVIROCON, INC.

House-Activity Form

We are interested in recording any activity which would release solvent vapor into the air while this test is being performed. Please check off any activity which applies to your household during the sampling period. In order for your house to be sampled, you must refrain from engaging in any of these activities for one day prior to air sampling.

Resident's Name ________

Address SE-16

Dates of Sampling 1/12/93

Painting or furniture-stripping during the past week	N	
Smoking — Latex Stored laquer thinner	N	
Deep fat frying	N	
Using dry-cleaning fluid Energine (1,1,1,-TCA) (SHOE-GOO PCE)	Y	
Bringing dry-cleaned clothes into the house during the past week	N	
Using furniture, floor, or leather polishes	Y	
Using carpet cleaner	N	
Using room deodorizers	N	
Using airplane glue or other glues	Y	Silicone Gel
Burning wood or ~~trash~~ in your fireplace	~~N~~ Y	
Using gasoline, kerosene lamps, or candles	N	

Were any windows or doors open for extended periods prior to the sampling event? Yes [✓ No]

ENVIROCON, INC.

101 INTERNATIONAL WAY
POST OFFICE BOX 8243
MISSOULA, MONTANA 59807
TELEPHONE (406) 523-1150
FAX (406) 523-1192

ENVIROCON, INC.

Building-Structure Survey

Address: SE-17

Name of person completing this form: J. MICHALETZ

Date: 1/13/93

1. Approximately how many square feet does your b~~asement~~ C-space cover? ________

2. Please indicate the type of floor your basement has.

   ____ Cement
   ✓ Bare earth & Gravel
   ____ Cinderblock
   ____ Other (please describe) ____________

3. Does your basement have any openings to the outside air other than the door leading to the rest of the house? Yes No If yes, please describe.

4. Approximately how many hours a week do you spend in your basement?

5. Are there any cans of paint, paint thinner, gasoline or other solvents being stored in your basement? If yes, please describe. Storage - boxes

6. Have you ever noticed any odors in your basement that you could not explain by the material you have stored there or by activities in the rest of the house? If so, please describe. NO

7. Does your house have a crawl space? [✓ Yes] No

8. If you do have a crawl space, approximately how many square feet does it cover? ________

9. Does your household use natural gas for cooking? Yes [✓ No] Electric

10. Please indicate the type of heating system you use.

    Forced-air natural gas
    Natural gas heaters
    Electric
    Wood
    Other Steam Boiler type

11. Please list the number of first-floor rooms in your house. 6
    The approximate square footage of these rooms is ________.

ENVIROCON, INC.

101 INTERNATIONAL WAY
POST OFFICE BOX 8243
MISSOULA, MONTANA 59807
TELEPHONE (406) 523-1150
FAX (406) 523-1182

House-Activity Form

ENVIROCON, INC.

We are interested in recording any activity which would release solvent vapor into the air while this test is being performed. Please check off any activity which applies to your household during the sampling period. In order for your house to be sampled, you must refrain from engaging in any of these activities for one day prior to air sampling.

Resident's Name SE-17

Address

Dates of Sampling 1/13/93

Painting or furniture-stripping during the past week		N
Smoking		Y
Deep fat frying		Y
Using dry-cleaning fluid		N
Bringing dry-cleaned clothes into the house during the past week		N
Using furniture, floor, or leather polishes	Trichoroethanol Chlorophenol	N
Using carpet cleaner	- Found in insect repellent	N
Using room deodorizers	& floor (linoleum) spray	N
Using airplane glue or other glues		N
Burning [✓ wood] or ~~trash~~ in your fireplace		Y
Using gasoline, kerosene lamps, or candles		N

Were any windows or doors open for extended periods prior to the sampling event? Yes [✓ No]

ENVIROCON, INC.

101 INTERNATIONAL WAY
POST OFFICE BOX 8243
MISSOULA, MONTANA 59807
TELEPHONE (406) 523-1150
FAX (406) 523-1182

ENVIROCON, INC.

Building-Structure Survey

Address: SE-18

[illegible]

Date: January 1192

1. Approximately how many square feet does your basement cover? ________

2. Please indicate the type of floor your basement has.

   ____ Cement
   _X_ Bare earth
   ____ Cinderblock
   ____ Other (please describe) ____________________

3. Does your basement have any openings to the outside air other than the door leading to the rest of the house? [✓ Yes] No If yes, please describe.
   FHA approved ventilation

4. Approximately how many hours a week do you spend in your basement?
   0 1 per month to oil the heater fan.

5. Are there any cans of paint, paint thinner, gasoline or other solvents being stored in your basement? If yes, please describe.

6. Have you ever noticed any odors in your basement that you could not explain by the material you have stored there or by activities in the rest of the house? If so, please describe. no

7. Does your house have a crawl space? [✓ Yes] No

8. If you do have a crawl space, approximately how many square feet does it cover? 700 ft.^{2}

9. Does your household use natural gas for cooking? Yes [✓ No]

10. Please indicate the type of heating system you use.

    + Forced-air natural gas
    Natural gas heaters
    Electric
    Wood
    Other ____________

11. Please list the number of first-floor rooms in your house. 5
    The approximate square footage of these rooms is 500 ft.^{2}

ENVIROCON, INC.

101 INTERNATIONAL WAY
POST OFFICE BOX 8243
MISSOULA, MONTANA 59807
TELEPHONE (406) 523-1150
FAX (406) 523-1182

ENVIROCON, INC.

House-Activity Form

We are interested in recording any activity which would release solvent vapor into the air while this test is being performed. Please check off any activity which applies to your household during the sampling period. In order for your house to be sampled, you must refrain from engaging in any of these activities for one day prior to air sampling.

Resident's Name

Address SE- 18

Dates of Sampling January 11 '92

Painting or furniture-stripping during the past week	✓
Smoking	
Deep fat frying	
Using dry-cleaning fluid	
Bringing dry-cleaned clothes into the house during the past week	
Using furniture, floor, or leather polishes	
Using carpet cleaner	
Using room deodorizers	✓
Using airplane glue or other glues	
Burning wood or trash in your fireplace	
Using gasoline, kerosene lamps, or candles	

Were any windows or doors open for extended periods prior to the sampling event? Yes No

ENVIROCON, INC.

101 INTERNATIONAL WAY
POST OFFICE BOX 8243
MISSOULA, MONTANA 59807
TELEPHONE (406) 523-1150
FAX (406) 523-1182

ENVIROCON, INC.

Building-Structure Survey

Address: SE-19

Name of person completing this form: J. Michaleten

Date: 11/12/93

1. Approximately how many square feet does your ~~basement~~ Crawlspace cover? ________

2. Please indicate the type of floor your basement has.

   ____ Cement
   [✓ Bare earth]
   ____ Cinderblock
   ____ Other (please describe) ____________

3. Does your basement have any openings to the outside air other than the door leading to the rest of the house? [✓ Yes] No If yes, please describe. 1 hatch

4. Approximately how many hours a week do you spend in your basement? 1 hr/month

5. Are there any cans of paint, paint thinner, gasoline or other solvents being stored in your basement? If yes, please describe. NO

6. Have you ever noticed any odors in your basement that you could not explain by the material you have stored there or by activities in the rest of the house? If so, please describe. NO

7. Does your house have a crawl space? [✓ Yes] No Includes Open Culvert Expos
   Groundwater
   (Cistern Room

8. If you do have a crawl space, approximately how many square feet does it cover? 744

9. Does your household use natural gas for ~~cooking~~ H₂O Heater? Yes No

10. Please indicate the type of heating system you use.

    Forced-air natural gas
    Natural gas heaters
    Electric
    Wood
    Other E

11. Please list the number of first-floor rooms in your house. 6
    The approximate square footage of these rooms is 1300 ft²

ENVIROCON, INC.

101 INTERNATIONAL WAY
POST OFFICE BOX 8243
MISSOULA, MONTANA 59807
TELEPHONE: (406) 523-1150
FAX: (406) 523-1182

House-Activity Form

ENVIROCON, INC.

We are interested in recording any activity which would release solvent vapor into the air while this test is being performed. Please check off any activity which applies to your household during the sampling period. In order for your house to be sampled, you must refrain from engaging in any of these activities for one day prior to air sampling.

Resident's Name ____________

Address SE-19

Dates of Sampling 1/12/93

Painting or furniture-stripping during the past week Staining during sampling Y

Smoking N

Deep fat frying N

Using dry-cleaning fluid N

Bringing dry-cleaned clothes into the house during the past week N
1 Dry-cleaned coat to be brought ho -Will be stored outside when brought home.

Using furniture, floor, or leather polishes N

Using carpet cleaner New Carpet - 2 rooms N

Using room deodorizers Not used in last week; infrequently ____

Using airplane glue or other glues [Glue for countertop to be used while sampling. - Epoxy Polyamide-] N

Burning [✓ wood] or ~~trash~~ in your fireplace Y

Using gasoline, kerosene lamps, or candles N

Were any windows or doors open for extended periods prior to the sampling event? Yes [✓ No]

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POST OFFICE BOX 8243
MISSOULA, MONTANA 59807
TELEPHONE: (406) 523-1150
FAX: (406) 523-1182

ENVIROCON, INC.

Building-Structure Survey

Address: SE-20

Name of person completing this form: J. Michalitz

Date: 1/13/93 pickup 1/27 07:55

1. Approximately how many square feet does your ~~basement~~ crawlspace cover? 600 ft.^{2}

2. Please indicate the type of floor your basement has.

   - ___ Cement
   - ✓ Bare earth
   - ___ Cinderblock
   - ___ Other (please describe) ___

3. Does your ~~basement~~ c-space have any openings ~~to~~ the outside air other than the door leading to the rest of the house? Yes [✓ No] If yes, please describe.

4. Approximately how many hours a week do you spend in your ~~basement~~ c-space?

5. Are there any cans of paint, paint thinner, gasoline or other solvents being stored in your basement? If yes, please describe. NO

6. Have you ever noticed any odors in your basement that you could not explain by the material you have stored there or by activities in the rest of the house? If so, please describe. NO

7. Does your house have a crawl space? [✓ Yes] No

8. If you do have a crawl space, approximately how many square feet does it cover? 600 ft.^{2}

9. Does your household use natural gas for cooking? Yes [✓ No] Electric

10. Please indicate the type of heating system you use.

    Forced-air natural gas
    Natural gas heaters
    Electric
    Wood
    Other ___

11. Please list the number of first-floor rooms in your house. 4
    The approximate square footage of these rooms is ___.

ENVIROCON, INC.

101 INTERNATIONAL WAY
POST OFFICE BOX 8243
MISSOULA, MONTANA 59807
TELEPHONE: (406) 523-1150
FAX: (406) 523-1182

ENVIROCON, INC.

House-Activity Form

We are interested in recording any activity which would release solvent vapor into the air while this test is being performed. Please check off any activity which applies to your household during the sampling period. In order for your house to be sampled, you must refrain from engaging in any of these activities for one day prior to air sampling.

Resident's Name SE-20

Address

Dates of Sampling 1/13/93 pick-up 1/27 07:55

Painting or furniture-stripping during the past week - Stored within the home	N
Smoking	N
Deep fat frying	N
Using dry-cleaning fluid	N
Bringing dry-cleaned clothes into the house during the past week	N
Using furniture, floor, or leather polishes Pledge, Common cleaners	N
Using carpet cleaner	N
Using room deodorizers	N
Using airplane glue or other glues	N
Burning ~~wood~~ or ~~trash~~ in your fireplace	N
Using gasoline, kerosene lamps, or candles Occassionally	N

Were any windows or doors open for extended periods prior to the sampling event? Yes [✓ No]

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ENVIROCON, INC.

Building-Structure Survey

Address: SE-21

Date: 1/11/92

1. Approximately how many square feet does your ~~basement~~ CRAWLSPACE cover? 1000 ft²

2. Please indicate the type of floor your basement has.

   ___ Cement
   _x_ Bare earth
   ___ Cinderblock
   ___ Other (please describe) ________

3. Does your basement have any openings to the outside air other than the door leading to the rest of the house? [✓ Yes] No If yes, please describe.

4. Approximately how many hours a week do you spend in your basement? 0

5. Are there any cans of paint, paint thinner, gasoline or other solvents being stored in your basement? If yes, please describe. NONE

6. Have you ever noticed any odors in your basement that you could not explain by the material you have stored there or by activities in the rest of the house? If so, please describe. NO

7. Does your house have a crawl space? [✓ Yes] No

8. If you do have a crawl space, approximately how many square feet does it cover? 1000 ft²

9. Does your household use natural gas for cooking? Yes [✓ No]

10. Please indicate the type of heating system you use.

    Forced-air natural gas
    [✓ Natural gas heaters]
    Electric
    Wood
    Other ________

11. Please list the number of first-floor rooms in your house. ________
    The approximate square footage of these rooms is ________.

ENVIROCON, INC.

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POST OFFICE BOX 8243
MISSOULA MONTANA 59807
TELEPHONE (406) 523-1150
FAX (406) 523-1182

House-Activity Form

ENVIROCON, INC.

We are interested in recording any activity which would release solvent vapor into the air while this test is being performed. Please check off any activity which applies to your household during the sampling period. In order for your house to be sampled, you must refrain from engaging in any of these activities for one day prior to air sampling.

Resident's Name [redacted]

Address [redacted] SE-21 [redacted]

Dates of Sampling 1/11/92

Painting or furniture-stripping during the past week	NO
Smoking	NO
Deep fat frying	NO
Using dry-cleaning fluid	NO
Bringing dry-cleaned clothes into the house during the past week	NO
Using furniture, floor, or leather polishes	YES
Using carpet cleaner	NO
Using room deodorizers	YES ([illegible] = o-phenylphenol)
Using airplane glue or other glues	NO
Burning wood or trash in your fireplace	NO
Using gasoline, kerosene lamps, or candles	INFREQUENTLY

Were any windows or doors open for extended periods prior to the sampling event? Yes [✓ No]

1 SPRAY CAN RAID SPIDER REPELLENT

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FAX (406) 523-1182

ENVIROCON, INC.

Building-Structure Survey

Address: SE-22

Name of person completing this form: J. Michalitz

Date: 1/13/93

1. Approximately how many square feet does your ~~basement~~ TRAILER cover? 840'

2. Please indicate the type of floor your basement has.

   ____ Cement
   ____ Bare earth
   ____ Cinderblock
   ____ Other (please describe) ____________

3. Does your basement have any openings to the outside air other than the door leading to the rest of the house? Yes No If yes, please describe.

4. Approximately how many hours a week do you spend in your basement? N/A

5. Are there any cans of paint, paint thinner, gasoline or other solvents being stored in your basement? If yes, please describe. No

6. Have you ever noticed any odors in your basement that you could not explain by the material you have stored there or by activities in the rest of the house? If so, please describe. NO

7. Does your house have a crawl space? Yes [✓ No]

8. If you do have a crawl space, approximately how many square feet does it cover? ________

9. Does your household use natural gas for cooking? Yes [✓ No] Electric

10. Please indicate the type of heating system you use.

    [✓ Forced-air natural gas]
    Natural gas heaters
    Electric
    Wood
    Other ____________

11. Please list the number of first-floor rooms in your house. 5
    The approximate square footage of these rooms is 840.

ENVIROCON, INC.

101 INTERNATIONAL WAY
POST OFFICE BOX 8243
MISSOULA, MONTANA 59807
TELEPHONE: (406) 523-1150
FAX (406) 523-1182

House-Activity Form

ENVIROCON, INC.

We are interested in recording any activity which would release solvent vapor into the air while this test is being performed. Please check off any activity which applies to your household during the sampling period. In order for your house to be sampled, you must refrain from engaging in any of these activities for one day prior to air sampling.

Resident's Name SE-22

Address

Dates of Sampling 1/13/93

Painting or furniture-stripping during the past week	NO
Smoking	YES
Deep fat frying	NO
Using dry-cleaning fluid	NO
Bringing dry-cleaned clothes into the house during the past week	NO
Using furniture, floor, or leather polishes	YES
Using carpet cleaner	NO
Using room deodorizers SPRAYS (LYSOL)	YES
Using airplane glue or other glues	NO
Burning wood or trash in your fireplace	NO
Using gasoline, kerosene lamps, or candles	NO

Were any windows or doors open for extended periods prior to the sampling event? Yes [✓ No]

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FAX: (406) 523-1182

ENVIROCON, INC.

Building-Structure Survey

Address: SE-23

Name of person completing this form: J. Michaletz

Date: 1/13/93

1. Approximately how many square feet does your ~~basement~~ C-space cover? ______

2. Please indicate the type of floor your basement has.

   - ☑ Cement
   - ☑ Bare earth
   - ☐ Cinderblock
   - ☐ Other (please describe) ______

3. Does your basement have any openings to the outside air other than the door leading to the rest of the house? Yes [✓ No] If yes, please describe.

4. Approximately how many hours a week do you spend in your basement? 0

5. Are there any cans of paint, paint thinner, gasoline or other solvents being stored in your basement? If yes, please describe. NO

6. Have you ever noticed any odors in your basement that you could not explain by the material you have stored there or by activities in the rest of the house? If so, please describe. NO

7. Does your house have a crawl space? [✓ Yes] No

8. If you do have a crawl space, approximately how many square feet does it cover? 1500 ft.²

9. Does your household use natural gas for cooking? Yes [✓ No] Elec.

10. Please indicate the type of heating system you use.

    - Forced-air natural gas
    - [✓ Natural gas heaters]
    - Electric
    - Wood
    - Other ______

11. Please list the number of first-floor rooms in your house. 5
    The approximate square footage of these rooms is 1500 ft²

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House-Activity Form

ENVIROCON, INC.

We are interested in recording any activity which would release solvent vapor into the air while this test is being performed. Please check off any activity which applies to your household during the sampling period. In order for your house to be sampled, you must refrain from engaging in any of these activities for one day prior to air sampling.

Resident's Name SE-23

Address

Dates of Sampling 1/13/93

Painting or furniture-stripping during the past week	N
Smoking	N
Deep fat frying	N
Using dry-cleaning fluid	N
Bringing dry-cleaned clothes into the house during the past week	Y
Using furniture, floor, or leather polishes Leather TANNER (1,1,1-TCA)	Y
Using carpet cleaner (Spot Remover) Other solvent-based cleaners	Y
Using room deodorizers	Y
Using airplane glue or other glues	N
Burning ~~wood~~ or ~~trash~~ in your fireplace	N
Using gasoline, kerosene lamps, or candles	N

Were any windows or doors open for extended periods prior to the sampling event? Yes [✓ No]

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ENVIROCON, INC.

Building-Structure Survey

Address: SE-24

Name of person completing this form: J. Michaletz

Date: 1/12/93

1. Approximately how many square feet does your ~~basement~~ upstairs cover? 1500 ft.^{2}

2. Please indicate the type of floor your basement has.

   _____ Cement
   __✓__ Bare earth
   _____ Cinderblock
   _____ Other (please describe) __________

3. Does your basement have any openings to the outside air other than the door leading to the rest of the house? Yes [✓ No] If yes, please describe.

4. Approximately how many hours a week do you spend in your basement? 0

5. Are there any cans of paint, paint thinner, gasoline or other solvents being stored in your basement? If yes, please describe. No

6. Have you ever noticed any odors in your basement that you could not explain by the material you have stored there or by activities in the rest of the house? If so, please describe. No

7. Does your house have a crawl space? [✓ Yes] No

8. If you do have a crawl space, approximately how many square feet does it cover? 200 ft.^{2}

9. Does your household use natural gas for cooking? Yes [✓ No] Electric

10. Please indicate the type of heating system you use.

    Forced-air natural gas
    Natural gas heaters
    Electric
    Wood
    Other Fireplace ~1/month

11. Please list the number of first-floor rooms in your house. 3 main
    The approximate square footage of these rooms is 1500 ft.^{2}

ENVIROCON, INC.

101 INTERNATIONAL WAY
POST OFFICE BOX 8243
MISSOULA, MONTANA 59807
TELEPHONE (406) 523-1150
FAX (406) 523-1182

ENVIROCON, INC.

House-Activity Form

We are interested in recording any activity which would release solvent vapor into the air while this test is being performed. Please check off any activity which applies to your household during the sampling period. In order for your house to be sampled, you must refrain from engaging in any of these activities for one day prior to air sampling.

Resident's Name ______

Address SE-24

Dates of Sampling 1/12/93

Painting or furniture-stripping during the past week N

Smoking N

Deep fat frying ★Pam Clontz N

Using dry-cleaning fluid Works at Olson's Dry Cleaners ← N

- Works in laundromat

Bringing dry-cleaned clothes into the house during the past week N - Done a few tir throughout year

Using [✓ furniture], floor, or leather polishes Common Cleaners Y

Using carpet cleaner N

Using room deodorizers Y Infrequently

Using airplane glue or other glues N

Burning [✓ wood] or ~~trash~~ in your [✓ fireplace] Y Once/Month

Using gasoline, kerosene lamps, or [✓ candles] V. Infrequently N

Were any windows or doors open for extended periods prior to the sampling event? Yes [✓ No]

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FAX (406) 523-1182

ENVIROCON, INC.

Building-Structure Survey

Address: SE-25

Name of person completing this form: J Middleton

Date: 1/12/93

1. Approximately how many square feet does your ~~basement~~ Crawlspace cover? 200 ft^2

2. Please indicate the type of floor your basement has.

    ____ Cement
    ✓ Bare earth
    ____ Cinderblock
    ____ Other (please describe) ____

3. Does your basement have any openings to the outside air other than the door leading to the rest of the house? [✓ Yes] No If yes, please describe. 3 openings

4. Approximately how many hours a week do you spend in your basement? 1-2 times/year

5. Are there any cans of paint, paint thinner, gasoline or other solvents being stored in your basement? If yes, please describe. NO

6. Have you ever noticed any odors in your basement that you could not explain by the material you have stored there or by activities in the rest of the house? If so, please describe. No (Sewer gas)

7. Does your house have a crawl space? [✓ Yes] No

8. If you do have a crawl space, approximately how many square feet does it cover? 200'

9. Does your household use natural gas for cooking? Yes [✓ No]

10. Please indicate the type of heating system you use.

    Forced-air natural gas
    ~~Natural gas heaters~~
    Electric
    [✓ Wood]
    Other ____

11. Please list the number of first-floor rooms in your house. 6
    The approximate square footage of these rooms is 1200 ft^2

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POST OFFICE BOX 8243
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FAX: (406) 523-1182

House-Activity Form

ENVIROCON, INC.

We are interested in recording any activity which would release solvent vapor into the air while this test is being performed. Please check off any activity which applies to your household during the sampling period. In order for your house to be sampled, you must refrain from engaging in any of these activities for one day prior to air sampling.

Resident's Name ____________

Address SE-25

Dates of Sampling 1/12/93

Painting or furniture-stripping during the past week	N
Smoking	Y ?
Deep fat frying	N
Using dry-cleaning fluid	N
Bringing dry-cleaned clothes into the house during the past week	N
Using furniture, floor, or leather polishes	Y
Using carpet cleaner Not Used Recently	N
Using room deodorizers	N
Using airplane glue or other glues	N
Burning ~~wood or trash~~ in your fireplace	Y
Using gasoline, kerosene lamps, or candles occasionally	Y

Were any windows or doors open for extended periods prior to the sampling event? Yes [✓ No]

Building-Structure Survey

Address SE-26

Name of person completing this form J. Mickelson

Date 1/26/93

1. Approximately how many square feet does your ~~basement~~ C-space cover?

2. Please indicate the type of floor your basement has.

   - ☐ Cement
   - ☒ Bare earth
   - ☒ Cinderblock walls
   - ☐ Other (please describe)

3. Does your basement have any openings to the outside air other than the door leading to the rest of the house? yes no If yes, please describe. ? (Possibly 2 ven

4. Approximately how many hours a week do you spend in your basement? 0

5. Are there any cans of paint, paint thinner, gasoline or other solvents being stored in your basement? If yes, please describe. NO

6. Have you ever noticed any odors in your basement that you could not explain by the material you have stored there or by activities in the rest of the house? If so, please describe. ? Not Sure

7. Does your house have a crawl space? [✓ yes] no

8. If you do have a crawl space, approximately how many square feet does it cover? ~700 ft²

9. Does your household use natural gas for cooking? yes [✓ no] Elec.

10. Please indicate the type of heating system you use.

    Forced air natural gas
    Natural gas heaters
    Electric
    Wood
    Other

12. Please describe the number of first floor rooms in your house. 5
    The approximate square footage of these rooms is ~700 ft².

House-Activity Form

We are interested in recording any activity which would release solvent vapor into the air while this test is being performed. Please check off any activity which applies to your household during the sampling period. In order for your house to be sampled you must refrain from engaging in any of these activities for one day prior to the air sampling.

Residents Name SE-26

Address

Dates of Sampling 1/13-26/93

Painting or furniture stripping during the past week		N
Smoking		N
Deep fat frying		N
Using dry-cleaning fluid		N
Bringing dry-cleaned clothes into the house during the past week		N
Using furniture, floor, or leather polish	Note: See list of household cleaning products from 1516 E. Lewis. Mrs. Cole owns both 1515 & 1516 & has been fixing up 1515 for her sister to move into.	
Using carpet cleaner		
Using room deodorizers		
Using airplane glue or other glues		
Burning wood or trash in your fireplace		N
Use of gasoline, kerosine lamps, or [✓ candles]		Y

Were any windows or doors open for extended periods prior to the sample event? yes [✓ no]

ENVIROCON, INC.

101 INTERNATIONAL WAY
POST OFFICE BOX 8243
MISSOULA, MONTANA 59807
TELEPHONE: (406) 523-1150
FAX: (406) 523-1182

ENVIROCON, INC.

Building-Structure Survey

Address: SE-27

Name of person completing this form: J Michaletz

Date: 1/12/93

1. Approximately how many square feet does your basement cover? 120ft.²

2. Please indicate the type of floor your basement has.

   ✓ Cement Basement
   ✓ Bare earth Crawlspace
   ☐ Cinderblock
   ☐ Other (please describe) ______

3. Does your basement have any openings to the outside air other than the door leading to the rest of the house? [✓ Yes] No If yes, please describe.

4. Approximately how many hours a week do you spend in your basement? 1 hr. /month(?)

5. Are there any cans of paint, paint thinner, gasoline or other solvents being stored in your basement? If yes, please describe. No

6. Have you ever noticed any odors in your basement that you could not explain by the material you have stored there or by activities in the rest of the house? If so, please describe. ?

7. Does your house have a crawl space? [✓ Yes] No

8. If you do have a crawl space, approximately how many square feet does it cover? 400 ft.²

9. Does your household use natural gas for cooking? Yes [✓ No] Elec.

10. Please indicate the type of heating system you use.

    Forced-air natural gas
    [✓ Natural gas heaters]
    Electric
    Wood
    Other ______

11. Please list the number of first-floor rooms in your house. 5 ½
    The approximate square footage of these rooms is 1500 ft² Also upstairs

ENVIROCON, INC.

101 INTERNATIONAL WAY
POST OFFICE BOX 8243
MISSOULA, MONTANA 59807
TELEPHONE: (406) 523-1150
FAX: (406) 523-1182

House-Activity Form

ENVIROCON, INC.

We are interested in recording any activity which would release solvent vapor into the air while this test is being performed. Please check off any activity which applies to your household during the sampling period. In order for your house to be sampled, you must refrain from engaging in any of these activities for one day prior to air sampling.

Resident's Name ______

Address SE-27

Dates of Sampling 1/12/93

Painting or furniture-stripping during the past week	N
Smoking	N
Deep fat frying	Y
Using dry-cleaning fluid	N
Bringing dry-cleaned clothes into the house during the past week	Y
Using furniture, floor, or leather polishes	N
Using carpet cleaner	N
Using room deodorizers Glade Aerosol Renuzit SOLID	Y
Using airplane glue or other glues Water-based, Elmers	Y
Burning ~~wood~~ or ~~trash~~ in your fireplace	N
Using gasoline, kerosene lamps, or candles	N

Were any windows or doors open for extended periods prior to the sampling event? Yes [✓ No]

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ENVIROCON, INC.

Building-Structure Survey

Address: SE-28

Name of person completing this form: J. Michaletz

Date: 1/13/93

1. Approximately how many square feet does your ~~basement~~ C-Space cover? 500 ft²

2. Please indicate the type of floor your basement has.

   ___ Cement
   ✓ Bare earth
   ___ Cinderblock
   ___ Other (please describe) ___

3. Does your basement have any openings to the outside air other than the door leading to the rest of the house? Yes [✓ No] If yes, please describe.

4. Approximately how many hours a week do you spend in your basement? 0

5. Are there any cans of paint, paint thinner, gasoline or other solvents being stored in your basement? If yes, please describe. NO

6. Have you ever noticed any odors in your basement that you could not explain by the material you have stored there or by activities in the rest of the house? If so, please describe.

7. Does your house have a crawl space? [✓ Yes] No

8. If you do have a crawl space, approximately how many square feet does it cover? 500 ft²

9. Does your household use natural gas for cooking? [✓ Yes] No

10. Please indicate the type of heating system you use.

    Forced-air natural gas
    [✓ Natural gas heaters]
    Electric
    Wood
    Other ___

FEB - 4 1993

11. Please list the number of first-floor rooms in your house. 4
    The approximate square footage of these rooms is 500 ft²

ENVIROCON, INC.

'01 INTERNATIONAL WAY
POST OFFICE BOX 8243
MISSOULA MONTANA 59807
TELEPHONE (406) 523-1150
FAX (406) 523-1182

House-Activity Form

ENVIROCON, INC.

We are interested in recording any activity which would release solvent vapor into the air while this test is being performed. Please check off any activity which applies to your household during the sampling period. In order for your house to be sampled, you must refrain from engaging in any of these activities for one day prior to air sampling.

Resident's Name ____________

Address SE-28

Box 789

Dates of Sampling 1/13/93

Painting or furniture-stripping during the past week	N	See
Smoking	N	← T. Phillips
Deep fat frying	N	
Using dry-cleaning fluid	N	
Bringing dry-cleaned clothes into the house during the past week	N	
Using furniture, floor, or leather polishes	?	
Using carpet cleaner	N	
Using room deodorizers	N	
Using airplane glue or other glues	?	
Burning ~~wood~~ or ~~trash~~ in your fireplace	N	
Using gasoline, kerosene lamps, or candles	N	

Were any windows or doors open for extended periods prior to the sampling event? Yes [✓ No]

ENVIROCON, INC.

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TELEPHONE (406) 523-1150
FAX (406) 523-1182

ENVIROCON, INC.

Building-Structure Survey

Address: SE-29

Name of person completing this form: J. MICHALETZ

Date: 1/13/93

1. Approximately how many square feet does your ~~basement~~ TRAILER cover? ______

2. Please indicate the type of floor your basement has.

   __/__ Cement
   __✓__ Bare earth
   _____ Cinderblock
   _____ Other (please describe) ______

3. Does your basement have any ~~openings~~ to the outside air other than the door leading to the rest of the ~~house~~? Yes No If yes, please describe.

4. Approximately how many hours a week do you spend in your basement? 0

5. Are there any cans of paint, paint thinner, gasoline or other solvents being stored in your basement? If yes, please describe. NO

6. Have you ever noticed any odors in your basement that you could not explain by the material you have stored there or by activities in the rest of the house? If so, please describe. NO

7. Does your house have a crawl ~~space? Yes~~ No

8. If you do have a crawl space, approximately how many square feet does it cover? ______

9. Does your household use natural gas for cooking? [✓ Yes] No

10. Please indicate the type of heating system you use.

    [✓ Forced-air natural gas]
    Natural gas heaters
    Electric
    Wood
    Other ______

11. Please list the number of first-floor rooms in your house. 5
    The approximate square footage of these rooms is 14' x 72'

ENVIROCON, INC.

101 INTERNATIONAL WAY
POST OFFICE BOX 8243
MISSOULA, MONTANA 59807
TELEPHONE: (406) 523-1150
FAX: (406) 523-1182

House-Activity Form

ENVIROCON, INC.

We are interested in recording any activity which would release solvent vapor into the air while this test is being performed. Please check off any activity which applies to your household during the sampling period. In order for your house to be sampled, you must refrain from engaging in any of these activities for one day prior to air sampling.

Resident's Name SE-29

Address

Dates of Sampling 1/13/93

Painting or furniture-stripping during the past week	N
Smoking	Y
Deep fat frying	Y
Using dry-cleaning fluid Resdv	Y
Bringing dry-cleaned clothes into the house during the past week	N
Using furniture, floor, or leather polishes	N
Using carpet cleaner (New carpet 1-2 yrs.)	N
Using room deodorizers Both Sprays & Solids	Y
Using airplane glue or other glues	N
Burning wood or trash in your fireplace	N
Using gasoline, kerosene lamps, or [✓ candles]	N

Were any windows or doors open for extended periods prior to the sampling event? Yes [✓ No]

ENVIROCON, INC.

101 INTERNATIONAL WAY
POST OFFICE BOX 8243
MISSOULA MONTANA 59807
TELEPHONE (406) 523-1150
FAX (406) 523-1182

ENVIROCON, INC.

Building-Structure Survey

Address: U-2

Name of person completing this form: J. Michaletz

Date: 1/12/93

1. Approximately how many square feet does your basement cover? Z

2. Please indicate the type of floor your basement has.

   ✓ Cement
   ___ Bare earth
   ___ Cinderblock
   ___ Other (please describe) ___

3. Does your basement have any openings to the outside air other than the door leading to the rest of the house? [✓ Yes] No If yes, please describe.

4. Approximately how many hours a week do you spend in your basement? Boiler Room Class rooms

5. Are there any cans of paint, paint thinner, gasoline or other solvents being stored in your basement? If yes, please describe. NUMEROUS PAINTS/CLEANERS/ SOLVENTS

6. Have you ever noticed any odors in your basement that you could not explain by the material you have stored there or by activities in the rest of the house? If so, please describe.

7. Does your house have a crawl space? Yes [✓ No]

8. If you do have a crawl space, approximately how many square feet does it cover? N/A

9. Does your household use natural gas for cooking? Yes No

10. Please indicate the type of heating system you use.

    Forced-air natural gas
    Natural gas heaters
    Electric
    Wood
    Other STEAM BOILER

11. Please list the number of first-floor rooms in your house. 5 MAIN
    The approximate square footage of these rooms is ___.

ENVIROCON, INC.

101 INTERNATIONAL WAY
POST OFFICE BOX 8243
MISSOULA, MONTANA 59807
TELEPHONE. (406) 523-1150
FAX: (406) 523-1182

ENVIROCON, INC.

House-Activity Form

We are interested in recording any activity which would release solvent vapor into the air while this test is being performed. Please check off any activity which applies to your household during the sampling period. In order for your house to be sampled, you must refrain from engaging in any of these activities for one day prior to air sampling.

Resident's Name U-2

Address

Dates of Sampling 1/12/93

Painting or furniture-stripping during the past week ____

Smoking (Boiler Room) ✓

Deep fat frying ____

Using dry-cleaning fluid ____

Bringing dry-cleaned clothes into the house during the past week ____

x Using furniture, floor, or leather polishes ✓

x Using carpet cleaner Numerous cleaners/solvents ✓

x Using room deodorizers ✓

x Using airplane glue or other glues ✓

Burning wood or trash in your fireplace ____

Using gasoline, kerosene lamps, or candles ____

Were any windows or doors open for extended periods prior to the sampling event? Yes No

Building-Structure Survey

Address NE-2

Name of person completing this form Joe Michaletz, DHES

Date 5 Feb '93

1. Approximately how many square feet does your basement cover? ~ 700 ft^2

2. Please indicate the type of floor your basement has.

X Cement
____ Bare earth
____ Cinderblock
____ Other (please describe) ____

3. Does your basement have any openings to the outside air other than the door leading to the rest of the house? [✓ yes] no If yes, please describe. Windows

4. Approximately how many hours a week do you spend in your basement?

5. Are there any cans of [✓ paint], [✓ paint thinner], gasoline or other solvents being stored in your basement? If ~~yes, please~~ describe. yes, + PVC Cement, other mineral spirits

6. Have you ever noticed any odors in your basement that you could not explain by the material you have stored there or by activities in the rest of the house? If so, please describe. No

7. Does your house have a crawl space? yes [✓ no]

8. If you do have a ~~crawl space~~, approximately how many square feet does it cover? ~~____~~

9. Does your household use natural gas for cooking? ~~yes~~ ~~no~~ None

10. Please indicate the type of heating system you use.

Forced air natural gas
Natural gas heaters
Electric
[✓ Wood]
Other Not currently used

12. Please describe the number of first floor rooms in your house. Open (gutted)
The approximate square footage of these rooms is ~700 ft^2.+

House-Activity Form

We are interested in recording any activity which would release solvent vapor into the air while this test is being performed. Please check off any activity which applies to your household during the sampling period. In order for your house to be sampled you must refrain from engaging in any of these activities for one day prior to the air sampling.

Residents Name NE-2

Address

Dates of Sampling 1/14/93 - 2/5/93

Painting or furniture stripping during the past week	N
Smoking	N
Deep fat frying	N
Using dry-cleaning fluid	N
Bringing dry-cleaned clothes into the house during the past week	N
Using furniture, floor, or leather polish	N
Using carpet cleaner	N
Using room deodorizers	N
Using airplane glue or other glues	N
Burning wood or trash in your fireplace	N
Use of gasoline, kerosine lamps, or candles	N

Were any windows or doors open for extended periods prior to the sample event? [✓ yes] no

ENVIROCON, INC.

101 INTERNATIONAL WAY
POST OFFICE BOX 8243
MISSOULA, MONTANA 59807
TELEPHONE (406) 523-1150
FAX (406) 523-1182

ENVIROCON, INC.

Building-Structure Survey

Address: NE-6

[illegible]

Name of person completing this form: J. Michaletz

Date: 1/13/93

1. Approximately how many square feet does your ~~basement~~ split-level cover? 1232 ft.²

2. Please indicate the type of floor your basement has.

✓ Cement
___ Bare earth
___ Cinderblock
___ Other (please describe) ____________

3. Does your basement have any openings to the outside air other than the door leading to the rest of the house? [✓ Yes] No If yes, please describe.

4. Approximately how many hours a week do you spend in your basement? 1 Bedroom
Full-finished lower l

5. Are there any cans of paint, paint thinner, gasoline or other solvents being stored in your basement? If yes, please describe. NO

6. Have you ever noticed any odors in your basement that you could not explain by the material you have stored there or by activities in the rest of the house? If so, please describe. NO

7. Does your house have a crawl space? Yes [✓ No]

8. If you do have a crawl space, approximately how many square feet does it cover? 1232 ft²

9. Does your household use natural gas for cooking? Yes No

10. Please indicate the type of heating system you use.

Forced-air natural gas
Natural gas heaters H₂O Only
Electric
Wood
Other ____________

11. Please list the number of first-floor rooms in your house. 5
The approximate square footage of these rooms is ______.

ENVIROCON, INC.

101 INTERNATIONAL WAY
POST OFFICE BOX 8243
MISSOULA MONTANA 59807
TELEPHONE (406) 523-1150
FAX (406) 523-1182

House-Activity Form

ENVIROCON, INC.

We are interested in recording any activity which would release solvent vapor into the air while this test is being performed. Please check off any activity which applies to your household during the sampling period. In order for your house to be sampled, you must refrain from engaging in any of these activities for one day prior to air sampling.

Resident's Name NE-6

Address

Dates of Sampling 1/13/92

Painting or furniture-stripping during the past week	N
Smoking	Y
Deep fat frying	N
Using dry-cleaning fluid	N
Bringing dry-cleaned clothes into the house during the past week	N
Using furniture, floor, or leather polishes Common Household Cleaners	N
Using carpet cleaner	N
Using room deodorizers	N
Using airplane glue or other glues (Elmers only)	N
Burning [✓ wood] or ~~trash~~ in your fireplace	Y
Using gasoline, kerosene lamps, or candles	N

Were any windows or doors open for extended periods prior to the sampling event? Yes [✓ No]

ENVIROCON, INC.

101 INTERNATIONAL WAY
POST OFFICE BOX 8243
MISSOULA, MONTANA 59807
TELEPHONE (406) 523-1150
FAX (406) 523-1162

ENVIROCON, INC.

Building-Structure Survey

Address: NE-9

Name of person completing this form: J. Michaletz

Date: 1/12/93

1. Approximately how many square feet does your basement cover? 120'

2. Please indicate the type of floor your basement has.

   ☐ Cement
   ☑ Bare earth
   ☐ Cinderblock
   ☐ Other (please describe) ____

3. Does your basement have any openings to the outside air other than the door leading to the rest of the house? Yes No If yes, please describe.

4. Approximately how many hours a week do you spend in your basement? $\frac{1}{2}$ - 1 hr./week

5. Are there any cans of [✓ paint], paint thinner, gasoline or other solvents being stored in your basement? If yes, please describe.

6. Have you ever noticed any odors in your basement that you could not explain by the material you have stored there or by activities in the rest of the house? If so, please describe. Desel Exhaust from LRY. Odors from Inciner

7. Does your house have a crawl space? [✓ Yes] No

8. If you do have a crawl space, approximately how many square feet does it cover? 200'

9. Does your household use natural gas for cooking? Yes [✓ No] Electric

10. Please indicate the type of heating system you use.

    Forced-air natural gas
    [✓ Natural gas heaters]
    Electric
    Wood
    Other ____

11. Please list the number of first-floor rooms in your house. ____
    The approximate square footage of these rooms is ____.

ENVIROCON, INC.

101 INTERNATIONAL WAY
POST OFFICE BOX 8243
MISSOULA, MONTANA 59807
TELEPHONE (406) 523-1150
FAX (406) 523-1182

ENVIROCON, INC.

House-Activity Form

We are interested in recording any activity which would release solvent vapor into the air while this test is being performed. Please check off any activity which applies to your household during the sampling period. In order for your house to be sampled, you must refrain from engaging in any of these activities for one day prior to air sampling.

Resident's Name [illegible]

Address NE-9

Dates of Sampling 1/12/93

Painting or furniture-stripping during the past week N

Smoking N

Deep fat frying N

Using dry-cleaning fluid N

Bringing dry-cleaned clothes into the house during the past week N

Using furniture, floor, or leather polishes Y - not often

Using carpet cleaner N

Using room deodorizers N

Using airplane glue or other glues ~~Kfo~~ Craft Glues N

Burning wood or trash in your fireplace NO

Using gasoline, kerosene lamps, or candles N

Were any windows or doors open for extended periods prior to the sampling event? Yes [✓ No]

Husband does small engine work.

ENVIROCON, INC.

101 INTERNATIONAL WAY
POST OFFICE BOX 8243
MISSOULA, MONTANA 59807
TELEPHONE (406) 523-1150
FAX (406) 523-1182

ENVIROCON, INC.

Building-Structure Survey

Address: NE-7

Name of person completing this form: J. Michaletz

Date: 1/12/93

1. Approximately how many square feet does your basement cover? 150 ft.² (Attached Crawlspace

2. Please indicate the type of floor your basement has.

   - ✓ Cement
   - ✓ Bare earth
   - ___ Cinderblock
   - ___ Other (please describe) ________

3. Does your basement have any openings to the outside air other than the door leading to the rest of the house? [✓ Yes] No If yes, please describe. 1 outside Vent

4. Approximately how many hours a week do you spend in your basement? ½-1 hr/month

5. Are there any cans of [✓ paint], paint thinner, gasoline or other solvents being stored in your basement? If yes, please describe. most stored in Garage

6. Have you ever noticed any odors in your basement that you could not explain by the material you have stored there or by activities in the rest of the house? If so, please describe. NO

7. Does your house have a crawl space? [✓ Yes] No

8. If you do have a crawl space, approximately how many square feet does it cover? 500 ft.²

9. Does your household use natural gas for cooking? Yes [✓ No] Electric

10. Please indicate the type of heating system you use.

    - [✓ Forced-air natural gas]
    - Natural gas heaters
    - Electric
    - Wood
    - Other ________

11. Please list the number of first-floor rooms in your house. 5
    The approximate square footage of these rooms is 720 ft.²

ENVIROCON, INC.

101 INTERNATIONAL WAY
POST OFFICE BOX 8243
MISSOULA, MONTANA 59807
TELEPHONE (406) 523-1150
FAX (406) 523-1182

House-Activity Form **ENVIROCON, INC.**

We are interested in recording any activity which would release solvent vapor into the air while this test is being performed. Please check off any activity which applies to your household during the sampling period. In order for your house to be sampled, you must refrain from engaging in any of these activities for one day prior to air sampling.

Resident's Name ______

Address NE-7

Dates of Sampling 1/12/93

Painting or furniture-stripping during the past week	N
Smoking	Y
Deep fat frying	N
Using dry-cleaning fluid	N
Bringing dry-cleaned clothes into the house during the past week	N
Using furniture, floor, or leather polishes Common household cleaners	Y
Using carpet cleaner (Tannery Leather Cleaner)	N
Using room deodorizers Lysol Aerosol	Y
Using airplane glue or other glues	N
Burning ~~wood~~ or ~~trash~~ in your fireplace	N
Using gasoline, kerosene lamps, or candles	N

Were any windows or doors open for extended periods prior to the sampling event? Yes [✓ No]

ENVIROCON, INC.

101 INTERNATIONAL WAY
POST OFFICE BOX 8243
MISSOULA, MONTANA 59807
TELEPHONE (406) 523-1150
FAX (406) 523-1182

ENVIROCON, INC.

Building-Structure Survey

Address: NE-8

Name of person completing this form: J. [illegible]

Date: 1/12/93

1. Approximately how many square feet does your basement cover? ________

2. Please indicate the type of floor your basement has.

   - ____ Cement
   - _✓_ Bare earth
   - ____ Cinderblock
   - ____ Other (please describe) ____________________

3. Does your basement have any openings to the outside air other than the door leading to the rest of the house? Yes [✓ No] If yes, please describe. Maybe

4. Approximately how many hours a week do you spend in your basement? 15 min/mo.

5. Are there any cans of [✓ paint], [✓ paint thinner], gasoline or other solvents being stored in your basement? If yes, please describe. Strippers

6. Have you ever noticed any odors in your basement that you could not explain by the material you have stored there or by activities in the rest of the house? If so, please describe. No

7. Does your house have a crawl space? [✓ Yes] No

8. If you do have a crawl space, approximately how many square feet does it cover? ________

9. Does your household use natural gas for cooking? Yes [✓ No]

10. Please indicate the type of heating system you use.

    - Forced-air natural gas
    - [✓ Natural gas heaters]
    - Electric
    - Wood
    - Other ____________

11. Please list the number of first-floor rooms in your house. 5
    The approximate square footage of these rooms is ________.

ENVIROCON, INC.

101 INTERNATIONAL WAY
POST OFFICE BOX 8243
MISSOULA MONTANA 59807
TELEPHONE (406) 523-1150
FAX (406) 523-1182

House-Activity Form

ENVIROCON, INC.

We are interested in recording any activity which would release solvent vapor into the air while this test is being performed. Please check off any activity which applies to your household during the sampling period. In order for your house to be sampled, you must refrain from engaging in any of these activities for one day prior to air sampling.

Resident's Name __________

Address NE-8

Dates of Sampling 1/12/93

Painting or [✓ furniture-stripping] during the past week Stored Upstairs - Contains Meth. Chloride	N
Smoking	N
Deep fat frying	N
Using dry-cleaning fluid	N
Bringing dry-cleaned clothes into the house during the past week	N
Using [✓ furniture], floor, or leather polishes 1/week polish	Y
Using carpet cleaner	N
Using room deodorizers Infrequently (Lysol)	Y
Using airplane glue or other glues	N
Burning ~~wood~~ or ~~trash~~ in your fireplace	N
Using gasoline, kerosene lamps, or candles	N

Were any windows or doors open for extended periods prior to the sampling event? Yes [✓ No]

ENVIROCON, INC.

101 INTERNATIONAL WAY
POST OFFICE BOX 8243
MISSOULA, MONTANA 59807
TELEPHONE (406) 523-1150
FAX (406) 523-1182

ENVIROCON, INC.

Building-Structure Survey

Address: NE-10

Date: 1-12-93

1. Approximately how many square feet does your basement cover? 900

2. Please indicate the type of floor your basement has.

    ____ Cement
    ✓ Bare earth
    ____ Cinderblock
    ____ Other (please describe) ____________

3. Does your basement have any openings to the outside air other than the door leading to the rest of the house? Yes [✓ No] If yes, please describe.

4. Approximately how many hours a week do you spend in your basement? 0

5. Are there any cans of paint, paint thinner, gasoline or other solvents being stored in your basement? If yes, please describe. No

6. Have you ever noticed any odors in your basement that you could not explain by the material you have stored there or by activities in the rest of the house? No If so, please describe.

7. Does your house have a crawl space? Yes [✓ No]

8. If you do have a crawl space, approximately how many square feet does it cover? ________

9. Does your household use natural gas for cooking? Yes [✓ No]

10. Please indicate the type of heating system you use.

    Forced-air natural gas
    Natural gas heaters
    Electric
    Wood
    Other ____________

11. Please list the number of first-floor rooms in your house. 5
    The approximate square footage of these rooms is 500.

A Washington Company

ENVIROCON, INC.

101 INTERNATIONAL WAY
POST OFFICE BOX 3243
MISSOULA, MONTANA 59807
TELEPHONE. (406) 523-1150
FAX: (406) 523-1182

House-Activity Form

ENVIROCON, INC.

We are interested in recording any activity which would release solvent vapor into the air while this test is being performed. Please check off any activity which applies to your household during the sampling period. In order for your house to be sampled, you must refrain from engaging in any of these activities for one day prior to air sampling.

Resident's Name __________

Address NE-10

Dates of Sampling __________

Painting or furniture-stripping during the past week	No
Smoking	No
Deep fat frying	No
Using dry-cleaning fluid	No
Bringing dry-cleaned clothes into the house during the past week	No
Using furniture, floor, or leather polishes	No
Using carpet cleaner	CARPET Dry Cleaned 4th Dec (Absorbent Chem. i
Using room deodorizers	No
Using airplane glue or other glues	NO
Burning wood or trash in your fireplace	YES
Using gasoline, kerosene lamps, or candles	No

Were any windows or doors open for extended periods prior to the sampling event? Yes [✓ No]

ENVIROCON, INC.

101 INTERNATIONAL WAY
POST OFFICE BOX 8243
MISSOULA, MONTANA 59807
TELEPHONE (406) 523-1150
FAX (406) 523-1182

ENVIROCON, INC.

Building-Structure Survey

Address: NE-11

Date: 1/11/93

1. Approximately how many square feet does your ~~basement~~ cover? —

2. Please indicate the type of floor your basement has.

   ✓ Cement
   ✓ Bare earth (most)
   ☐ Cinderblock
   ☐ Other (please describe) ______

3. Does your basement have any openings to the outside air other than the door leading to the rest of the house? Yes No If yes, please describe. 12" x 6" [illegible]

4. Approximately how many hours a week do you spend in your basement? N/C

5. Are there any cans of paint, paint thinner, gasoline or other solvents being stored in your basement? If yes, please describe. None in Basement

6. Have you ever noticed any odors in your basement that you could not explain by the material you have stored there or by activities in the rest of the house? If so, please describe. NO

7. Does your house have a crawl space? [✓ Yes] No

8. If you do have a crawl space, approximately how many square feet does it cover? ______

9. Does your household use natural gas for cooking? Yes No

10. Please indicate the type of heating system you use.

    Forced-air natural gas ✓
    Natural gas heaters
    Electric
    Wood ✓
    Other ______

11. Please list the number of first-floor rooms in your house. 6
    The approximate square footage of these rooms is [illegible]

ENVIROCON, INC.

101 INTERNATIONAL WAY
POST OFFICE BOX 8243
MISSOULA, MONTANA 59807
TELEPHONE (406) 523-1150
FAX: (406) 523-1182

House-Activity Form

ENVIROCON, INC.

We are interested in recording any activity which would release solvent vapor into the air while this test is being performed. Please check off any activity which applies to your household during the sampling period. In order for your house to be sampled, you must refrain from engaging in any of these activities for one day prior to air sampling.

Resident's Name NE-11

Address

Dates of Sampling 1/11/93

Painting or furniture-stripping during the past week NO

Smoking Yes

Deep fat frying NO

Using dry-cleaning fluid NO

Bringing dry-cleaned clothes into the house during the past week NO

Using furniture, floor, or leather polishes NO

Using carpet cleaner NOT RECENTLY NO

Using room deodorizers (Hairspray) NO

Using airplane glue or other glues NO

Burning wood or trash in your fireplace YES

Using gasoline, kerosene lamps, or candles NO

Were any windows or doors open for extended periods prior to the sampling event? Yes [✓ No]

ENVIROCON, INC.

101 INTERNATIONAL WAY
POST OFFICE BOX 8243
MISSOULA, MONTANA 59807
TELEPHONE (406) 523-1150
FAX (406) 523-1182

ENVIROCON, INC.

Building-Structure Survey

Address: NE-12

Name of person completing this form: J. Michaletz

Date: ____________

1. Approximately how many square feet does your basement cover? 800 ft.²

2. Please indicate the type of floor your basement has.

   - ✓ Cement
   - ___ Bare earth
   - ___ Cinderblock
   - ___ Other (please describe) ____________

3. Does your basement have any openings to the outside air other than the door leading to the rest of the house? [✓ Yes] No If yes, please describe.

4. Approximately how many hours a week do you spend in your basement? 4 Kids play room Master Bedroom

5. Are there any cans of [✓ paint], paint thinner, gasoline or other solvents being stored in your basement? If yes, please describe. Oil-based

6. Have you ever noticed any odors in your basement that you could not explain by the material you have stored there or by activities in the rest of the house? If so, please describe. Minor Sewer Gas Odors

7. Does your house have a crawl space? Yes [✓ No]

8. If you do have a crawl space, approximately how many square feet does it cover? ________

9. Does your household use natural gas for cooking? [✓ Yes] No

10. Please indicate the type of heating system you use.

    - Forced-air natural gas
    - Natural gas heaters Hot Water
    - Electric
    - Wood
    - Other ____________

11. Please list the number of first-floor rooms in your house. 5
    The approximate square footage of these rooms is 870 ft.²

ENVIROCON, INC.

101 INTERNATIONAL WAY
POST OFFICE BOX 8243
MISSOULA, MONTANA 59807
TELEPHONE (406) 523-1150
FAX: (406) 523-1182

House-Activity Form

ENVIROCON, INC.

We are interested in recording any activity which would release solvent vapor into the air while this test is being performed. Please check off any activity which applies to your household during the sampling period. In order for your house to be sampled, you must refrain from engaging in any of these activities for one day prior to air sampling.

Resident's Name NE-12

Address

Dates of Sampling 1/12/93

Painting or furniture-stripping during the past week Latex painting 1/9/93 Y

Smoking N

Deep fat frying Infrequently Y

Using dry-cleaning fluid (possibly) ?

Bringing dry-cleaned clothes into the house during the past week N

Using furniture, floor, or leather polishes Pledge Furniture/Cleaners 111-TCA

Using carpet cleaner ?

Using room deodorizers N

Using airplane glue or other glues N

Burning wood or trash in your fireplace N

Using gasoline, kerosene lamps, or candles N

Were any windows or doors open for extended periods prior to the sampling event? Yes [✓ No]

ENVIROCON, INC.

101 INTERNATIONAL WAY
POST OFFICE BOX 8243
MISSOULA MONTANA 59807
TELEPHONE (406) 523-1150
FAX (406) 523-1182

ENVIROCON, INC.

Building-Structure Survey

Address: NE-13

Name of person completing this form: J. Michalitz

Date: 1/17/93

1. Approximately how many square feet does your basement cover? ________

2. Please indicate the type of floor your basement has.

   ✓ Cement
   ____ Bare earth Some Exposed
   ____ Cinderblock
   ____ Other (please describe) ________

3. Does your basement have any openings to the outside air other than the door leading to the rest of the house? [✓ Yes] No If yes, please describe.
   Windows - No Vents

4. Approximately how many hours a week do you spend in your basement? Kids Play Room
   10 HRS.

5. Are there any cans of paint, paint thinner, gasoline or other solvents being stored in your basement? If yes, please describe. No

6. Have you ever noticed any odors in your basement that you could not explain by the material you have stored there or by activities in the rest of the house? If so, please describe. Owner notes odor in tap water

7. Does your house have a crawl space? [✓ Yes] No
   Partial - unused

8. If you do have a crawl space, approximately how many square feet does it cover? ________

9. Does your household use natural gas for cooking? [✓ Yes] No

10. Please indicate the type of heating system you use.

    Forced-air natural gas
    Natural gas heaters
    Electric
    Wood
    Other ________

11. Please list the number of first-floor rooms in your house. 6
    The approximate square footage of these rooms is ________

ENVIROCON, INC.

101 INTERNATIONAL WAY
POST OFFICE BOX 8243
MISSOULA, MONTANA 59807
TELEPHONE: (406) 523-1150
FAX: (406) 523-1182

House-Activity Form

ENVIROCON, INC.

We are interested in recording any activity which would release solvent vapor into the air while this test is being performed. Please check off any activity which applies to your household during the sampling period. In order for your house to be sampled, you must refrain from engaging in any of these activities for one day prior to air sampling.

Resident's Name NE-13

Address [illegible]

Dates of Sampling 1/12/93

Painting or furniture-stripping during the past week	N
Smoking	Y
Deep fat frying	N
Using dry-cleaning fluid	N
Bringing dry-cleaned clothes into the house during the past week	N
Using furniture, floor, or leather polishes Common Household Cleaning Products	Y
Using carpet cleaner	N
Using room deodorizers	N
Using airplane glue or other glues	N
Burning ~~wood~~ or ~~trash~~ in your fireplace	N
Using gasoline, kerosene lamps, or candles	N

Were any windows or doors open for extended periods prior to the sampling event? Yes [✓ No]

ENVIROCON, INC.

101 INTERNATIONAL WAY
POST OFFICE BOX 8243
MISSOULA, MONTANA 59807
TELEPHONE: (406) 523-1150
FAX: (406) 523-1182

ENVIROCON, INC.

Building-Structure Survey

Address: NE-14

[illegible]

Name of person completing this form: J. MICHALETZ

Date: 1/13/93

1. Approximately how many square feet does your ~~basement~~ TRAILER cover? 906 ft.^{2}

2. Please indicate the type of floor your ~~basement~~ trailer has.

   ☐ Cement
   ☑ Bare earth
   ☐ Cinderblock
   ☐ Other (please describe) ________

3. Does your ~~basement~~ trailer have any openings to the outside air other than the door leading to the rest of the house? [✓ Yes] No If yes, please describe.

4. Approximately how many hours a week do you spend in your ~~basement~~ skirted area beneath trail?
   ~~1 hr~~ 1 hr./mo.

5. Are there any cans [✓ of paint,] paint thinner, gasoline or other solvents being stored in your basement? If yes, please describe.

6. Have you ever noticed any odors in your basement that you could not explain by the material you have stored there or by activities in the rest of the house? If so, please describe. Sensitive (allergies) to LRY diesel exhaust & incinerator fum

7. Does your ~~house~~ trailer have a crawl space? [✓ Yes] No

8. If you do have a crawl space, approximately how many square feet does it cover? 906 ft.^{2}

9. Does your household use natural gas for cooking? [✓ Yes] No

10. Please indicate the type of heating system you use.

   [✓ Forced-air natural gas]
   Natural gas heaters
   Electric
   Wood
   Other ________

11. Please list the number of first-floor rooms in your house. 6
   The approximate square footage of these rooms is 906 ft^2

ENVIROCON, INC.

101 INTERNATIONAL WAY
POST OFFICE BOX 8243
MISSOULA MONTANA 59807
TELEPHONE (406) 523-1150
FAX (406) 523-1182

House-Activity Form

ENVIROCON, INC.

We are interested in recording any activity which would release solvent vapor into the air while this test is being performed. Please check off any activity which applies to your household during the sampling period. In order for your house to be sampled, you must refrain from engaging in any of these activities for one day prior to air sampling.

Resident's Name NE-14

Address

Dates of Sampling 1/13/93

Painting or furniture-stripping during the past week	N
Smoking	N
Deep fat frying	N
Using dry-cleaning fluid	N
Bringing dry-cleaned clothes into the house during the past week	N
Using furniture, floor, or leather polishes Numerous cleaners (Some spot cleaners containing "solvents")	Y
Using carpet cleaner	N
Using room deodorizers Occassionally	Y
Using airplane glue or other glues	N
Burning ~~wood~~ or ~~trash~~ in your fireplace	N
Using gasoline, kerosene lamps, or candles	N

Were any windows or doors open for extended periods prior to the sampling event? Yes [✓ No]

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MISSOULA, MONTANA 59807
TELEPHONE (406) 523-1150
FAX (406) 523-1182

ENVIROCON, INC.

Building-Structure Survey

Address: NE-15

Name of person completing this form: J. Michaletz

Date: 1/13/93

1. Approximately how many square feet does your basement cover? ________

2. Please indicate the type of floor your basement has.

   - ✓ Cement
   - ✓ Bare earth
   - ____ Cinderblock
   - ____ Other (please describe) ________

3. Does your basement have any openings to the outside air other than the door leading to the rest of the house? [✓ Yes] No If yes, please describe.

4. Approximately how many hours a week do you spend in your basement? Laundry Room

5. Are there any cans of paint, paint thinner, gasoline or other solvents being stored in your basement? If yes, please describe. Y

6. Have you ever noticed any odors in your basement that you could not explain by the material you have stored there or by activities in the rest of the house? If so, please describe. N

7. Does your house have a crawl space? [✓ Yes] No PARTIAL

8. If you do have a crawl space, approximately how many square feet does it cover? 100 ft.^{2}

9. Does your household use natural gas for cooking? Yes [✓ No] Electric

10. Please indicate the type of heating system you use.

    - Forced-air natural gas
    - [✓ Natural gas heaters]
    - Electric
    - Wood
    - Other hot water

11. Please list the number of first-floor rooms in your house. 6
    The approximate square footage of these rooms is 1000 ft^2

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MISSOULA, MONTANA 59807
TELEPHONE. (406) 523-1150
FAX: (406) 523-1182

House-Activity Form

ENVIROCON, INC.

We are interested in recording any activity which would release solvent vapor into the air while this test is being performed. Please check off any activity which applies to your household during the sampling period. In order for your house to be sampled, you must refrain from engaging in any of these activities for one day prior to air sampling.

Resident's Name NE-15

Address

Dates of Sampling 1/13/93

Painting or furniture-stripping during the past week	N
Smoking	Y
Deep fat frying	N
Using dry-cleaning fluid	N
Bringing dry-cleaned clothes into the house during the past week	N
Using furniture, floor, or leather polishes (1,1,1,-TCA)	N
Using carpet cleaner (Nylac) Common Household Cleaners	Y
Using room deodorizers	Y
Using airplane glue or other glues	N
Burning wood or trash in your fireplace	N
Using gasoline, kerosene lamps, or candles	N

Were any windows or doors open for extended periods prior to the sampling event? Yes [✓ No]

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TELEPHONE (406) 523-1150
FAX (406) 523-1182

ENVIROCON, INC.

Building-Structure Survey

Address: NE-16

Name of person completing this form: J. Michaletz

Date: 1/12/93

1. Approximately how many square feet does your basement cover? ________

2. Please indicate the type of floor your basement has.

   ✓ Cement
   ___ Bare earth
   ___ Cinderblock
   ___ Other (please describe) ________

3. Does your basement have any openings to the outside air other than the door leading to the rest of the house? [✓ Yes] No If yes, please describe.

4. Approximately how many hours a week do you spend in your basement? 8-10 HRS. WEEK

5. Are there any cans of paint, paint thinner, gasoline or other solvents being stored in your basement? If yes, please describe.

6. Have you ever noticed any odors in your basement that you could not explain by the material you have stored there or by activities in the rest of the house? If so, please describe. NO

7. Does your house have a ~~crawl space~~? 10' x 10' root cellar Yes No

8. If you do have a crawl space, approximately how many square feet does it cover? 100 ft.²

9. Does your household use natural gas for cooking? Yes [✓ No] Electric

10. Please indicate the type of heating system you use.

    ___ Forced-air natural gas
    ___ Natural gas heaters
    ___ Electric
    ___ Wood
    ___ Other ________

11. Please list the number of first-floor rooms in your house. 5 ½
    The approximate square footage of these rooms is 1200 ft²

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MISSOULA, MONTANA 59807
TELEPHONE: (406) 523-1150
FAX: (406) 523-1182

ENVIROCON, INC.

House-Activity Form

We are interested in recording any activity which would release solvent vapor into the air while this test is being performed. Please check off any activity which applies to your household during the sampling period. In order for your house to be sampled, you must refrain from engaging in any of these activities for one day prior to air sampling.

Resident's Name NE-16

Address

Dates of Sampling 1/12/93

Painting or furniture-stripping during the past week Varnish	Y
Smoking	N
Deep fat frying	N
Using dry-cleaning fluid	N
Bringing dry-cleaned clothes into the house during the past week	N
Using furniture, floor, or leather polishes	N
Using carpet cleaner	N
Using room deodorizers Spray	Y
Using airplane glue or other glues	N
Burning [✓ wood] or ~~trash~~ in your fireplace	Y
Using gasoline, kerosene lamps, or candles	N

Were any windows or doors open for extended periods prior to the sampling event? Yes No

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TELEPHONE: (406) 523-1150
FAX: (406) 523-1182

ENVIROCON, INC.

Building-Structure Survey

Address: NE-17

Name of person completing this form: J. MICHALETZ

Date: 1/12/93

1. Approximately how many square feet does your basement cover? 1200 ft.^{2} bedrooms bath

2. Please indicate the type of floor your basement has.

   ✓ Cement
   ___ Bare earth
   ___ Cinderblock
   ___ Other (please describe) ___

3. Does your basement have any openings to the outside air other than the door leading to the rest of the house? [✓ Yes] No If yes, please describe.

4. Approximately how many hours a week do you spend in your basement? Bedrooms Used

5. Are there any cans of paint, paint thinner, gasoline or other solvents being stored in your basement? If yes, please describe. Yes

6. Have you ever noticed any odors in your basement that you could not explain by the material you have stored there or by activities in the rest of the house? If so, please describe. NO

7. Does your house have a crawl space? Yes [✓ No]

8. If you do have a crawl space, approximately how many square feet does it cover? ___

9. Does your household use natural gas for cooking? Yes [✓ No] Electric

10. Please indicate the type of heating system you use.

    Forced-air natural gas
    Natural gas heaters
    Electric
    Wood
    Other ___

11. Please list the number of first-floor rooms in your house. 5
    The approximate square footage of these rooms is 1200 ft^2

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101 INTERNATIONAL WAY
POST OFFICE BOX 8243
MISSOULA, MONTANA 59807
TELEPHONE: (406) 523-1150
FAX: (406) 523-1182

House-Activity Form

ENVIROCON, INC.

We are interested in recording any activity which would release solvent vapor into the air while this test is being performed. Please check off any activity which applies to your household during the sampling period. In order for your house to be sampled, you must refrain from engaging in any of these activities for one day prior to air sampling.

Resident's Name NE-17

Address

Dates of Sampling 1/12/93

Painting or furniture-stripping during the past week		N
Smoking		N
Deep fat frying		N
Using dry-cleaning fluid	(Chlorinated Solvent Spot Cleaners) "Lift-off"	N
Bringing dry-cleaned clothes into the house during the past week		N
Using furniture, floor, or leather polishes	Water Repellent Spray for Shoes	Y
Using carpet cleaner (Spot-Cleaner)	1 Spray Can of "Lift Off", which Contains Chlorinated Solvents (Solid Gold Cleaner) 1,1,1-TCA	Y
Using room deodorizers		N
Using airplane glue or other glues (Glue Gun)		Y
Burning ~~wood~~ or ~~trash~~ in your fireplace		N
Using gasoline, kerosene lamps, or [✓ candles]		N

Were any windows or doors open for extended periods prior to the sampling event? Yes No

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FAX (406) 523-1182

ENVIROCON, INC.

Building-Structure Survey

Address: NE-18

Name of person completing this form: J. Michaletz

Date: 1/12/93

1. Approximately how many square feet does your basement cover? 400 ft^2

2. Please indicate the type of floor your basement has.

   ✓ Cement Basement
   ✓ Bare earth Crawlspace
   ☐ Cinderblock
   ☐ Other (please describe) ________

3. Does your basement have any openings to the outside air other than the door leading to the rest of the house? Yes [✓ No] If yes, please describe.

4. Approximately how many hours a week do you spend in your basement? 1 hr./month

5. Are there any cans of paint, paint thinner, gasoline or other solvents being stored in your basement? If yes, please describe. No, except craft paints.

6. Have you ever noticed any odors in your basement that you could not explain by the material you have stored there or by activities in the rest of the house? If so, please describe. NO

7. Does your house have a crawl space? [✓ Yes] No Partial

8. If you do have a crawl space, approximately how many square feet does it cover? ________

9. Does your household use natural gas for cooking? Yes [✓ No] Electric

10. Please indicate the type of heating system you use.

    Forced-air natural gas
    Natural gas heaters
    Electric
    Wood
    Other Fireplace used daily

11. Please list the number of first-floor rooms in your house. 6 1/2
    The approximate square footage of these rooms is ________.

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ENVIROCON, INC.

House-Activity Form

We are interested in recording any activity which would release solvent vapor into the air while this test is being performed. Please check off any activity which applies to your household during the sampling period. In order for your house to be sampled, you must refrain from engaging in any of these activities for one day prior to air sampling.

Resident's Name NE-18

Address

Dates of Sampling 1/12/93

Painting or furniture-stripping during the past week	Oil-Painting (Hobby)	Y
Smoking		N
Deep fat frying		N
Using dry-cleaning fluid		N
Bringing dry-cleaned clothes into the house during the past week		N
Using furniture, floor, or leather polishes		N
Using carpet cleaner		N
Using room deodorizers	Aerosols & SOLIDS - Note some Chrorinated Solvent Cleaners*	Y
Using airplane glue or other glues		N
Burning wood or ~~trash~~ in your fireplace		Y
Using gasoline, kerosene lamps, or candles		N

Were any windows or doors open for extended periods prior to the sampling event? Yes [✓ No]

1 Aerosol Can "KIWI Wet Pruf" contains PCE

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MISSOULA, MONTANA 59807
TELEPHONE: (406) 523-1150
FAX: (406) 523-1182

ENVIROCON, INC.

Building-Structure Survey

Address: NE-19

Name of person completing this form: J. Michaletz

Date: 1/12/93

1. Approximately how many square feet does your ~~basement~~ Crawlspace cover? ________

2. Please indicate the type of floor your basement has.

   ____ Cement
   __✓__ Bare earth
   ____ Cinderblock
   ____ Other (please describe) ____________

3. Does your basement have any openings to the outside air other than the door leading to the rest of the house? Yes [✓ No] If yes, please describe.

4. Approximately how many hours a week do you spend in your basement? 1 time / yr.

5. Are there any cans of paint, paint thinner, gasoline or other solvents being stored in your basement? If yes, please describe. Nothing

6. Have you ever noticed any odors in your basement that you could not explain by the material you have stored there or by activities in the rest of the house? If so, please describe. No

7. Does your house have a crawl space? [✓ Yes] No

8. If you do have a crawl space, approximately how many square feet does it cover? 1000 ft^2

9. Does your household use natural gas for cooking? [✓ Yes] No

10. Please indicate the type of heating system you use.

    [✓ Forced-air natural gas] back up
    Natural gas heaters
    Electric
    Wood
    Other ____________

11. Please list the number of first-floor rooms in your house. 5
    The approximate square footage of these rooms is 1000. ft^2

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101 INTERNATIONAL WAY
POST OFFICE BOX 8243
MISSOULA, MONTANA 59807
TELEPHONE: (406) 523-1150
FAX: (406) 523-1182

ENVIROCON, INC.

House-Activity Form

We are interested in recording any activity which would release solvent vapor into the air while this test is being performed. Please check off any activity which applies to your household during the sampling period. In order for your house to be sampled, you must refrain from engaging in any of these activities for one day prior to air sampling.

Resident's Name ______________

Address NE-19

Dates of Sampling 1/12/93

Painting or furniture-stripping during the past week		N
Smoking		Y
Deep fat frying		N
Using dry-cleaning fluid		N
Bringing dry-cleaned clothes into the house during the past week		N
Using furniture, floor, or leather polishes	Ammonia Bleach, Etc.	N
Using carpet cleaner		N
Using room deodorizers	Glade Potpourri	Y
Using airplane glue or other glues		N
Burning [✓ wood] or ~~trash~~ in your fireplace		~~N~~ Y
Using gasoline, kerosene lamps, or candles		N

Were any windows or doors open for extended periods prior to the sampling event? Yes [✓ No]

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101 INTERNATIONAL WAY
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TELEPHONE (406) 523-1150
FAX (406) 523-1182

ENVIROCON, INC.

Building-Structure Survey

Address: N-20

Name of person completing this form: ____

Date: Jan 22-93 - Feb 5 '93

1. Approximately how many square feet does your basement cover? 14x70

2. Please indicate the type of floor your basement has.

   ______ Cement
   __✓__ Bare earth
   ______ Cinderblock
   ______ Other (please describe) ______

3. Does your basement have any openings to the outside air other than the door leading to the rest of the house? Yes [✓ No] If yes, please describe.

4. Approximately how many hours a week do you spend in your basement? -0-

5. Are there any cans of paint, paint thinner, gasoline or other solvents being stored in your basement? If yes, please describe. No

6. Have you ever noticed any odors in your basement that you could not explain by the material you have stored there or by activities in the rest of the house? If so, please describe. Yes
   a chemical odor

7. Does your house have a crawl space? Yes [✓ No]

8. If you do have a crawl space, approximately how many square feet does it cover? -0-

9. Does your household use natural gas for cooking? Yes [✓ No]

10. Please indicate the type of heating system you use.

    Forced-air natural gas
    [✓ Natural gas heaters]
    Electric
    [✓ Wood]
    Other ______

11. Please list the number of first-floor rooms in your house. 3
    The approximate square footage of these rooms is 12x10'.

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101 INTERNATIONAL WAY
POST OFFICE BOX 8243
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TELEPHONE: (406) 523-1150
FAX. (406) 523-1182

House-Activity Form

ENVIROCON, INC.

We are interested in recording any activity which would release solvent vapor into the air while this test is being performed. Please check off any activity which applies to your household during the sampling period. In order for your house to be sampled, you must refrain from engaging in any of these activities for one day prior to air sampling.

Resident's Name N-20

Address

Dates of Sampling Jan 22-93

Painting or furniture-stripping during the past week	no
Smoking	yes
Deep fat frying	no
Using dry-cleaning fluid	no
Bringing dry-cleaned clothes into the house during the past week	no
Using furniture, floor, or leather polishes	no
Using carpet cleaner	yes
Using room deodorizers	yes
Using airplane glue or other glues	no
Burning wood or trash in your fireplace	yes
Using gasoline, kerosene lamps, or candles	no

Were any windows or doors open for extended periods prior to the sampling event? Yes [✓ No]

APPENDIX B
DATA ON STANDARDIZING SAMPLED AIR VOLUMES

VIII. Calculation Procedures

1. Using gas chromatography analysis methods, determine the weight of each contaminant present on the monitor in milligrams.

2. Correct the weight by subtracting out the number of milligrams, if any, found in the blank sample for each individual contaminant.

3. Determine the recovery efficiency for each contaminant. The procedure found in the #3500 Compound Guide Notebook titled, "Recommended Procedure for Determination of Recovery Coefficients" should be utilized.

4. Using the Organic Vapor Monitor #3500 Compound Guide, determine the sampling rate for each contaminant.

5. Determine the sampling time in minutes for the contaminants from the back label of the exposed monitor.

6. Calculate the contaminant concentration using the following equations:

$$\frac{mg}{m^3} = \frac{(W)\,(10^6\ cm^3/m^3)}{(r)\,(K_0)\,(t)}$$

Where:

W = Corrected weight in milligrams

r = Recovery (Desorption) efficiency

K_0 = Monitor Sampling rate, $cm^3/min.$

t = Sampling time, minutes

7. To calculate concentration in ppm at reference conditions of 298°K and 760 mm Hg use the following equation:

$$ppm = \frac{mg}{m^3} \times \frac{24.45}{MW}$$

Where:

MW = Molecular weight, g /mole

The above equations calculate concentrations that can be strictly compared to OSHA standards only if the temperature during sampling was 298°K (25°C or 77°). If sampling temperature is significantly different than 298°K, then a correction can be applied as follows:

Temperature corrected concentration C_0

$$C_0 = \frac{mg}{m^3} \times \left(\frac{298°K}{Ts}\right)^{1/2}$$

$$C_0 = ppm \times \left(\frac{298°K}{Ts}\right)^{1/2}$$

Where:

Ts = Temperature at Sample Site in °K.

This correction eliminates an error of approximately 1% for every 10°F (5.6°C) increment above or below 77°F (25°C).

See the 3M Brand Organic Vapor Monitor #3500 Analysis Guide for complete details and example calculations.

Notice:

3M disclaims responsibility for any comparison of test data to any existing or future health and safety standard regulating exposures to organic vapor as to whether such standards are or are not adequate to insure the safety of persons or property. 3M warrants only the accuracy of the sampling analytical methods and the data obtained thereby.

Table B-1

Passive Dosimeter Sampling Times & Standard Correction Factors

LOCATION	SAMPLER	DATE	TIME INIT		DATE	TIME FIN		SAMPLED	TEMPERATURE		TEMP	Std Corr
		INIT.	[HRS]	[MIN]	FIN.	[HRS]	[MIN]	MIN	i	f	[K]	factor
SE-12	WD 5991	11	14	20	25	14	13	20153	68	66	292	1.009
SE-12	WD 5847	11	14	15	25	14	15	20160	40	50	280	1.031
SE-21	WD 6092	11	14	40	25	14	30	20150	68	74	295	1.006
SE-15	WD 6221	11	15	0	25	15	20	20180	68	68	293	1.008
SE-15	WD 6111	11	15	10	25	15	20	20170	68	65	292	1.010
SE-18	WD 5757	11	15	35	25	15	30	20155	68	68	293	1.008
SE-18	WD 6203	11	15	45	25	15	30	20145	55	68	289	1.015
NE-11	WD 5788	11	16	10	25	15	50	20199	75	68	295	1.005
NE-10	WD 6096	12	8	10	26	8	10	20160	65	63	291	1.012
NE-10	WD 6060	12	8	20	26	8	10	20150	55	63	288	1.017
SE-25	WK 4635	12	8	40	26	8	25	20145	65	60	290	1.014
NE-13	WK 4474	12	9	10	26	8	30	20120	70	70	294	1.007
NE-13	WK 4510	12	9	20	26	8	30	20110	70	70	294	1.007
SE-19	WK 4671	12	9	30	26	8	45	20115	70	70	294	1.007
SE-19	WK 4589	12	9	50	26	8	45	20095	55	50	284	1.024
SE-24	WK 4600	12	10	10	26	16	0	20510	70	70	294	1.007
SE-24	WK 4593	12	10	25	26	16	0	20495	42	42	279	1.034
NE-7	WK 4476	12	10	40	26	9	15	20075	70	70	294	1.007
NE-7	WK 4581	12	10	50	26	9	15	20065	70	65	293	1.009
NE-8	WK 4850	12	11	10	25	15	55	19005	70	67	293	1.008
SE-16	WK 4750	12	12	40	26	13	5	20185	65	68	292	1.010
SE-5	WK 4847	12	13	30	26	13	20	20150	70	72	295	1.006
SE-5	WK 4694	12	13	35	26	13	20	20145	70	72	295	1.006
SE-5	WK 4682	12	13	15	26	13	20	20165	65	72	293	1.008
NE-9	WK 4786	12	13	45	26	9	25	19900	70	70	294	1.007
NE-9	WK 4776	12	13	45	26	9	25	19900	70	70	294	1.007
NE-9	WK 4698	12	13	40	26	9	25	19905	65	65	291	1.011
SE-27	WK 4456	12	14	10	26	14	10	20160	68	70	294	1.008
SE-27	WK 4766	12	14	20	26	14	10	20150	68	70	294	1.008
SE-27	WK 4448	12	14	20	26	14	10	20150	65	65	291	1.011
SE-14	WK 4573	12	14	35	26	9	40	19865	65	66	292	1.011
SE-14	WK 4423	12	14	20	26	9	40	19880	60	60	289	1.016
U-2	WK 4721	12	15	20	26	15	0	20140	70	73	295	1.005
U-2	WK 4641	12	15	10	26	15	0	20150	70	70	294	1.007
NE-18	WK 4422	12	15	45	26	14	25	20080	70	67	293	1.008
NE-18	WK 4536	12	15	50	26	14	25	20075	65	65	291	1.011
NE-12	WK 4500	12	16	15	26	14	40	20065	65	70	293	1.009
NE-12	WK 4661	12	16	20	26	14	40	20060	65	65	291	1.011
NE-19	WK 4755	12	16	50	26	14	45	20035	70	70	294	1.007
NE-16	WK 4695	12	17	5	26	17	15	20170	70	68	294	1.008
NE-16	WK 4818	12	17	10	26	17	15	20165	75	75	297	1.002
SE-20	WK 4827	13	7	35	27	7	55	20180	70	70	294	1.007
SE-10	WK 4833	13	8	0	27	8	10	20170	70	70	294	1.007
SE-10	WK 4828	13	8	5	27	8	10	20165	60	60	289	1.016

Table B-1

Passive Dosimeter Sampling Times & Standard Correction Factors

LOCATION	SAMPLER	DATE	TIME INIT		DATE	TIME FIN		SAMPLED	TEMPERATURE		TEMP	Std Corr
		INIT	[HRS]	[MIN]	FIN.	[HRS]	[MIN]	MIN	i	f	[K]	factor
SE-28	WK 4688	13	8	30	27	9	0	20190	68	65	292	1.010
SE-28	WK 4831	13	8	40	27	9	0	20180	30	30	272	1.047
NE-6	WK 4749	13	9	5	27	9	25	20180	70	72	295	1.006
NE-6	WK 4199	13	9	10	27	9	25	20175	60	65	290	1.014
SE-26	WK 4242	13	10	0	26	15	27	19047	65	60	290	1.014
SE-26	WK 4303	13	9	55	26	15	20	19045	60	65	290	1.014
SE-11	WK 4245	13	10	15	26	15	5	19010	70	70	294	1.007
SE-11	WK 4181	13	10	15	26	15	5	19010	65	65	291	1.011
NE-14	WK4218	13	11	10	27	11	25	20175	70	70	294	1.007
NE-14	WK 4195	13	11	15	27	11	25	20170	50	50	283	1.026
SE-23	WK 4168	13	11	40	27	11	5	20125	65	70	293	1.009
NE-15	WK 4662	13	12	10	27	17	10	20460	68	70	294	1.008
NE-15	WK 4632	13	12	20	27	17	10	20450	65	70	293	1.009
NE-17	WK 4651	13	12	40	27	17	20	20440	70	70	294	1.007
NE-17	WK 4445	13	12	40	27	17	20	20440	65	70	293	1.009
NE-17	WK 4560	13	12	40	27	17	20	20440	65	70	293	1.009
SE-29	WK 4606	13	13	15	27	16	55	20380	70	68	294	1.008
SE-29	WK 4530	13	13	15	27	16	55	20380	70	68	294	1.008
SE-22	WK 4438	13	14	40	26	16	20	18820	70	70	294	1.007
SE-17	WK 4649	13	17	0	26	15	50	18650	68	70	294	1.008
SE-17	WK 4450	13	17	10	26	15	50	18640	68	70	294	1.008
SE-17	WK 4878	13	17	10	26	15	50	18640	57	55	286	1.020
NE-2	WK 4798	14	13	15	36	9	25	31450	20	28	269	1.053
NE-2	WK 4861	14	13	15	36	9	25	31450	17	25	267	1.057
AMB-4	WK 4879	15	14	0	36	10	5	30005	35	35	275	1.042
AMB-3	WK 4930	15	14	15	36	10	15	30000	35	35	275	1.042
AMB-2	WK 4715	15	14	30	36	10	20	29990	35	35	275	1.042
AMB-1	WK 4762	15	14	40	36	10	25	29985	35	35	275	1.042
NE-20	WK 4857	22	9	15	36	9	12	20157	75	70	296	1.004
NE-20	WK 4683	22	9	15	36	9	15	20160	55	55	286	1.021

Table B-2
Multisorbent Tube Correction Factors

LOCATION	S #	RTO #	CORR F	[Qi]	[Qf]	Q diff [%]	STATUS [OK/NG]	Q bar [ml/min]
AMB-1	72	3	1.08	12.6	15.4	18.2	NG	15.12
AMB-1	103	3	1.08	10.0	10.0	0.0	OK	10.80
AMB-4	80	3	1.08	12.7	12.7	0.0	OK	13.72
AMB-4	118	3	1.08	13.3	13.5	1.5	OK	14.47
AMB-2	8	3	1.08	13.0	14.6	11.0	OK	14.90
AMB-2	95	3	1.08	11.3	11.5	1.7	OK	12.31
AMB-3	32	3	1.08	13.0	13.6	4.4	OK	14.36
AMB-3	51	3	1.08	11.0	11.0	0.0	OK	11.88

LOCATION	S #	Time i [hr]	[min]	Time f [hr]	[min]	Ave Time [min]	VOL act [liters]	Temp i
AMB-1	72	10	55	15	0	245	3.70	40
AMB-1	103	10	55	15	0	245	2.65	40
AMB-4	80	11	15	15	20	245	3.36	40
AMB-4	118	11	15	15	20	245	3.55	40
AMB-2	8	11	40	15	35	235	3.50	40
AMB-2	95	11	40	15	35	235	2.89	40
AMB-3	32	11	55	15	45	230	3.30	40
AMB-3	51	11	55	15	45	230	2.73	40

LOCATION	S #	Temp f	TEMP [F]	TEMP [K]	PRESSURE i	f	Ave Pres [" hg]	VOL std [liters]
AMB-1	72	50	45	280	25.5	25.45	25.48	3.35
AMB-1	103	50	45	280	25.5	25.45	25.48	2.40
AMB-4	80	51	45.5	281	25.5	25.45	25.48	3.04
AMB-4	118	51	45.5	281	25.5	25.45	25.48	3.21
AMB-2	8	50	45	280	25.5	25.45	25.48	3.17
AMB-2	95	50	45	280	25.5	25.45	25.48	2.62
AMB-3	32	50	45	280	25.5	25.45	25.48	2.99
AMB-3	51	50	45	280	25.5	25.45	25.48	2.47

APPENDIX C
ANALYTICAL RESULTS

MASS167, 1/31/93

ANALYTICAL REPORT

Berkeley Analytical Associates
904 Wright Avenue, No. 12
Richmond, CA 94804
510/236-2325
FAX 510/236-2335

Job Code: 06004

Report Date: January 31, 1993
Client: Envirocon, Inc.
Client Job Number: 140101, BN/Livingston
Analysis Type: GC-MS SIM, Quantitative Analysis of Vinyl Chloride
Instrument: Envirochem UNACON 810A & HP 5971A
Samplers Received: January 29, 1993
Samplers Analyzed: January 30, 1993
Analyst: Al Hodgson

Report Approved By:

Quantitative Analysis of Tetrachloroethene (PCE).

Sampler No.	GC-MS Data File	Volume (std. L)	Mass (ng)	Conc. (ug m^{-3})
System Blank	01303_05	NA	<0.5	---
065	01303_06	NA	<0.5	---
103	01303_07	2.40	<0.5	<0.2
118	01303_08	3.21	3.2	1.0
008	01303_09	3.17	32.2	10.2
051	01303_10	2.47	11.4	4.6
032	01303_11	2.99	14.0	4.7

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FAX (406) 252-6069 • 1-800-735-4489

February 9, 1993

Dan McCaffery
Envirocon, Inc.
P.O. Box 8243
Missoula, MT 59807

On January 27, 28, and 29th, 1993 these samples, represented by our laboratory numbers 93-4514 to 93-4538, 93-4599 to 93-4634, and 93-4727 to 93-4733 were submitted to our laboratory for analysis.

The test results and quality assurance were reviewed and approved by the undersigned.

Reviewed by:________________________

FEB 10 1993

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LABORATORY REPORT

TO: Dan McCaffery
ADDRESS: Envirocon, Inc.
P.O. Box 8243
Missoula, MT 59807

LAB NO.: 93-4514 -30
DATE: 02/09/93 da

Page 1 of 5

ORGANIC VAPOR MONITOR ANALYSIS

Lab No.	Identification	µg/badge	µg/m^3	ppb
93-4514(1)	WD 5757	9.4	15.7	2.3
93-4515(2)	WD 6060	10.4	17.4	2.6
93-4516	WK 4805, Monitor Blank	<2.5	N/A	N/A
93-4517	WK 4763, Monitor Blank	<2.5	N/A	N/A
93-4518(3)	WD 5788	<2.5	<4.2	<0.6
93-4519	WD 5847	<2.5	<4.2	<0.6
93-4520	WD 5991	<2.5	<4.2	<0.6
93-4521	WD 6092	<2.5	<4.2	<0.6
93-4522	WD 6096	<2.5	<4.2	<0.6
93-4523(3)	WD 6111	<2.5	<4.2	<0.6
93-4524	WD 6203	<2.5	<4.2	<0.6
93-4525(3)	WD 6221	<2.5	<4.2	<0.6
93-4526(3)	WK 4476	<2.5	<4.2	<0.6
93-4527(3)	WK 4474	<2.5	<4.2	<0.6
93-4528(3)	WK 4423	<2.5	<4.2	<0.6
93-4529(3)	WK 4573	<2.5	<4.2	<0.6
93-4530	WK 4589	<2.5	<4.2	<0.6

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LABORATORY REPORT

TO: Dan McCaffery
ADDRESS: Envirocon, Inc.
P.O. Box 8243
Missoula, MT 59807

LAB NO.: 93-4531-38, 4599-607
DATE: 02/09/93 da

Page 2 of 5

ORGANIC VAPOR MONITOR ANALYSIS

Lab No.	Identification	μg/badge	$\mu g/m^3$	ppb
93-4531	WK 4581	<2.5	<4.2	<0.6
93-4532(3)	WK 4510	<2.5	<4.2	<0.6
93-4533(3)	WK 4635	<2.5	<4.2	<0.6
93-4534(3)	WK 4698	<2.5	<4.2	<0.6
93-4535(3)	WK 4671	<2.5	<4.2	<0.6
93-4536(3)	WK 4786	<2.5	<4.2	<0.6
93-4537(3)	WK 4776	<2.5	<4.2	<0.6
93-4538	WK 4850	<2.5	<4.5	<0.7
93-4599	WK 4500	<2.5	<4.2	<0.6
93-4600(3)	WK 4536	<2.5	<4.2	<0.6
93-4601(3)	WK 4438	<2.5	<4.5	<0.7
93-4602	WK 4755	<2.5	<4.2	<0.6
93-4603	WK 4766	<2.5	<4.2	<0.6
93-4604(3)	WK 4721	<2.5	<4.2	<0.6
93-4605(3)	WK 4422	<2.5	<4.2	<0.6
93-4606	WK 4641	<2.5	<4.2	<0.6
93-4607(3)	WK 4661	<2.5	<4.2	<0.6

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LABORATORY REPORT

TO: Dan McCaffery
ADDRESS: Envirocon, Inc.
P.O. Box 8243
Missoula, MT 59807

LAB NO.: 93-4608 -24
DATE: 02/09/93 da

Page 3 of 5

ORGANIC VAPOR MONITOR ANALYSIS

Lab No.	Identification	μg/badge	μg/m^3	ppb
93-4608(2)	WK 4878	2.8	5.0	0.7
93-4609	WK 4593	<2.5	<4.2	<0.6
93-4610(2)	WK 4600	4.1	6.8	1.0
93-4611(4)	WK 4649	2.5	4.5	0.7
93-4612	WK 4242	<2.5	<4.5	<0.7
93-4613(3)	WK 4847	<2.5	<4.2	<0.6
93-4614	WK 4448	<2.5	<4.2	<0.6
93-4615	WK 4303	<2.5	<4.5	<0.7
93-4616(4)	WK 4682	3.1	5.2	0.8
93-4617(4)	WK 4450	2.5	4.5	0.7
93-4618(3)	WK 4456	<2.5	<4.2	<0.6
93-4619	WK 4181	<2.5	<4.5	<0.7
93-4620(3)	WK 4694	<2.5	<4.2	<0.6
93-4621	WK 4245	<2.5	<4.5	<0.7
93-4622	WK 4750	<2.5	<4.2	<0.6
93-4623	WK 4831	<2.5	<4.2	<0.6
93-4624	WK 4828	<2.5	<4.2	<0.6

LABORATORY REPORT

TO: Dan McCaffery
ADDRESS: Envirocon, Inc.
P.O. Box 8243
Missoula, MT 59807

LAB NO.: 93-4625-34, 4727 -31
DATE: 02/09/93 da

Page 4 of 5

ORGANIC VAPOR MONITOR ANALYSIS

Lab No.	Identification	µg/badge	µg/m³	ppb
93-4625(4)	WK 4218	2.5	4.2	0.6
93-4626	WK 4688	<2.5	<4.2	<0.6
93-4627	WK 4199	<2.5	<4.2	<0.6
93-4628	WK 4833	<2.5	<4.2	<0.6
93-4629	WK 4195	<2.5	<4.2	<0.6
93-4630(2)	WK 4818	8.4	14.0	2.1
93-4631(3)	WK 4749	<2.5	<4.2	<0.6
93-4632	WK 4168	<2.5	<4.2	<0.6
93-4633	WK 4827	<2.5	<4.2	<0.6
93-4634(2)	WK 4695	11.4	19.0	2.8
93-4727(3)	WK 4530	<2.5	<4.2	<0.6
93-4728(3)	WK 4606	<2.5	<4.2	<0.6
93-4729(4)	WK 4651	6.1	10.0	1.5
93-4730(2)	WK 4445	11.3	18.9	2.8
93-4731(2)	WK 4560	12.0	20.0	3.0

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LABORATORY REPORT

TO: Dan McCaffery
ADDRESS: Envirocon, Inc.
P.O. Box 8243
Missoula, MT 59807

LAB NO.: 93-4732 -33
DATE: 02/09/93 da

Page 5 of 5

ORGANIC VAPOR MONITOR ANALYSIS

Lab No.	Identification	µg/badge	µg/m^3	ppb
93-4732[3]	WK 4662	<2.5	<4.2	<0.6
93-4733	WK 4632	<2.5	<4.2	<0.6

(1)The solvent extract evaporated from it's container because of a faulty vial lid before the result could be confirmed by GC/MS. There were no abnormalities with the peak shape or elution time to indicate matrix interference.

(2)Analytical value confirmed by GC/MS.

(3)Analysis was confirmed by GC/MS due to sample matrix interference.

(4)The reported value was taken from GC/MS quantitation due to sample matrix interference.

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LABORATORY REPORT

TO: Dan McCaffery
ADDRESS: Envirocon, Inc.
P.O. Box 8243
Missoula, MT 59807

LAB NO.: 93-4514
DATE: 02/09/93 da

ORGANIC VAPOR MONITOR ANALYSIS

Monitor No.:	WD 5757
Date Exposed:	01/11/93 @ 1535 to 01/25/93 @ 1530
I.D.:	None
Temperature:	N/A
Relative Humidity:	N/A
Exposure Time:	20155 minutes
Sampled by:	Dan McCaffery
Analysis date:	01/28/93

CAS No.	Constituent	μg/badge	μg/m^3	ppb
127-18-4	Tetrachloroethylene	9.4	15.7	2.3

REMARKS: A 3M Brand Organic Vapor Monitor #3500 was used and was analyzed using techniques from NIOSH Physical & Chemical Analytical Method 1003 for charcoal tubes. The sampling rate used for the tetrachloroethylene quantitation was 28.3 cc/min with a recovery coefficient of 1.05 as provided by 3M.

NOTE: The solvent extract evaporated from it's container because of a faulty vial lid before the result could be confirmed by GC/MS. There were no abnormalities with the peak shape or elution time to indicate matrix interference.

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LABORATORY REPORT

TO: Dan McCaffery
ADDRESS: Envirocon, Inc.
P.O. Box 8243
Missoula, MT 59807

LAB NO.: 93-4515
DATE: 02/03/93 da

ORGANIC VAPOR MONITOR ANALYSIS

Monitor No.:	WD 6060
Date Exposed:	01/12/93 @ 0820 to 01/26/93 @ 0810
I.D.:	None
Temperature:	N/A
Relative Humidity:	N/A
Exposure Time:	20150 minutes
Sampled by:	Dan McCaffery
Analysis date:	01/28/93

CAS No.	Constituent	µg/badge	$\mu g/m^3$	ppb
127-18-4	Tetrachloroethylene	10.4	17.4	2.6

REMARKS: A 3M Brand Organic Vapor Monitor #3500 was used and was analyzed using techniques from NIOSH Physical & Chemical Analytical Method 1003 for charcoal tubes. The sampling rate used for the tetrachloroethylene quantitation was 28.3 cc/min with a recovery coefficient of 1.05 as provided by 3M.

NOTE: Analytical value confirmed by GC/MS.

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LABORATORY REPORT

TO: Dan McCaffery
ADDRESS: Envirocon, Inc.
P.O. Box 8243
Missoula, MT 59807

LAB NO.: 93-4516
DATE: 02/03/93 da

ORGANIC VAPOR MONITOR ANALYSIS

Monitor No.: WK 4805, Monitor Blank
Date Exposed: N/A
I.D.: None
Temperature: N/A
Relative Humidity: N/A
Exposure Time: 0.00 minutes
Sampled by: Dan McCaffery
Analysis date: 01/28/93

CAS No.	Constituent	µg/badge	µg/m^3	ppb
127-18-4	Tetrachloroethylene	<2.5	N/A	N/A

REMARKS: A 3M Brand Organic Vapor Monitor #3500 was used and was analyzed using techniques from NIOSH Physical & Chemical Analytical Method 1003 for charcoal tubes. The sampling rate used for the tetrachloroethylene quantitation was 28.3 cc/min with a recovery coefficient of 1.05 as provided by 3M.

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LABORATORY REPORT

TO:	Dan McCaffery	**LAB NO.:**	93-4517
ADDRESS:	Envirocon, Inc. P.O. Box 8243 Missoula, MT 59807	**DATE:**	02/03/93 da

ORGANIC VAPOR MONITOR ANALYSIS

Monitor No.: WK 4763 Monitor Blank
Date Exposed: N/A
I.D.: None
Temperature: N/A
Relative Humidity: N/A
Exposure Time: 0.00 minutes
Sampled by: N/A
Analysis date: 01/28/93

CAS No.	Constituent	µg/badge	µg/m³	ppb
127-18-4	Tetrachloroethylene	<2.5	N/A	N/A

REMARKS: A 3M Brand Organic Vapor Monitor #3500 was used and was analyzed using techniques from NIOSH Physical & Chemical Analytical Method 1003 for charcoal tubes. The sampling rate used for the tetrachloroethylene quantitation was 28.3 cc/min with a recovery coefficient of 1.05 as provided by 3M.

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LABORATORY REPORT

TO: Dan McCaffery
ADDRESS: Envirocon, Inc.
P.O. Box 8243
Missoula, MT 59807

LAB NO.: 93-4518
DATE: 02/03/93 da

ORGANIC VAPOR MONITOR ANALYSIS

Monitor No.:	WD 5788
Date Exposed:	01/11/93 @ 1610 to 01/25/93 @ 1550
I.D.:	None
Temperature:	N/A
Relative Humidity:	N/A
Exposure Time:	20199 minutes
Sampled by:	Dan McCaffery
Analysis date:	01/28/93

CAS No.	Constituent	μg/badge	μg/m^3	ppb
127-18-4	Tetrachloroethylene	<2.5	<4.2	<0.6

REMARKS: A 3M Brand Organic Vapor Monitor #3500 was used and was analyzed using techniques from NIOSH Physical & Chemical Analytical Method 1003 for charcoal tubes. The sampling rate used for the tetrachloroethylene quantitation was 28.3 cc/min with a recovery coefficient of 1.05 as provided by 3M.

NOTE: Analysis was confirmed by GC/MS due to sample matrix interference.

ENERGY LABORATORIES

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LABORATORY REPORT

TO: Dan McCaffery
ADDRESS: Envirocon, Inc.
P.O. Box 8243
Missoula, MT 59807

LAB NO.: 93-4519
DATE: 02/03/93 da

ORGANIC VAPOR MONITOR ANALYSIS

Monitor No.: WD 5847
Date Exposed: 01/11/93 @ 1415 to 01/23/93 @ 1415
I.D.: None
Temperature: N/A
Relative Humidity: N/A
Exposure Time: 20160 minutes
Sampled by: Dan McCaffery
Analysis date: 01/28/93

CAS No.	Constituent	μg/badge	μg/m³	ppb
127-18-4	Tetrachloroethylene	<2.5	<4.2	<0.6

REMARKS: A 3M Brand Organic Vapor Monitor #3500 was used and was analyzed using techniques from NIOSH Physical & Chemical Analytical Method 1003 for charcoal tubes. The sampling rate used for the tetrachloroethylene quantitation was 28.3 cc/min with a recovery coefficient of 1.05 as provided by 3M.

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LABORATORY REPORT

TO: Dan McCaffery
ADDRESS: Envirocon, Inc.
P.O. Box 8243
Missoula, MT 59807

LAB NO.: 93-4520
DATE: 02/03/93 da

ORGANIC VAPOR MONITOR ANALYSIS

Monitor No.: WD 5991
Date Exposed: 01/11/93 @ 1415 to 01/23/93 @ 1413
I.D.: None
Temperature: N/A
Relative Humidity: N/A
Exposure Time: 20153 minutes
Sampled by: Dan McCaffery
Analysis date: 01/28/93

CAS No.	Constituent	µg/badge	µg/m^3	ppb
127-18-4	Tetrachloroethylene	<2.5	<4.2	<0.6

REMARKS: A 3M Brand Organic Vapor Monitor #3500 was used and was analyzed using techniques from NIOSH Physical & Chemical Analytical Method 1003 for charcoal tubes. The sampling rate used for the tetrachloroethylene quantitation was 28.3 cc/min with a recovery coefficient of 1.05 as provided by 3M.

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LABORATORY REPORT

TO: Dan McCaffery
ADDRESS: Envirocon, Inc.
P.O. Box 8243
Missoula, MT 59807

LAB NO.: 93-4521
DATE: 02/03/93 da

ORGANIC VAPOR MONITOR ANALYSIS

Monitor No.: WD 6092
Date Exposed: 01/11/93 @ 1440 to 01/23/93 @ 1430
I.D.: None
Temperature: N/A
Relative Humidity: N/A
Exposure Time: 20150 minutes
Sampled by: Dan McCaffery
Analysis date: 01/28/93

CAS No.	Constituent	μg/badge	$\mu g/m^3$	ppb
127-18-4	Tetrachloroethylene	<2.5	<4.2	<0.6

REMARKS: A 3M Brand Organic Vapor Monitor #3500 was used and was analyzed using techniques from NIOSH Physical & Chemical Analytical Method 1003 for charcoal tubes. The sampling rate used for the tetrachloroethylene quantitation was 28.3 cc/min with a recovery coefficient of 1.05 as provided by 3M.

ENERGY LABORATORIES

ENERGY LABORATORIES, INC.
P.O. BOX 30916 • 1107 SOUTH BROADWAY • BILLINGS, MT 59107-0916 • PHONE (406) 252-6325
FAX (406) 252-6069 • 1-800-735-4489

LABORATORY REPORT

TO:	Dan McCaffery	**LAB NO.:**	93-4522
ADDRESS:	Envirocon, Inc. P.O. Box 8243 Missoula, MT 59807	**DATE:**	02/03/93 da

ORGANIC VAPOR MONITOR ANALYSIS

Monitor No.:	WD 6096
Date Exposed:	01/12/93 @ 0810 to 01/26/93 @ 0810
I.D.:	None
Temperature:	N/A
Relative Humidity:	N/A
Exposure Time:	20160 minutes
Sampled by:	Dan McCaffery
Analysis date:	01/28/93

CAS No.	Constituent	μg/badge	μg/m^3	ppb
127-18-4	Tetrachloroethylene	<2.5	<4.2	<0.6

REMARKS: A 3M Brand Organic Vapor Monitor #3500 was used and was analyzed using techniques from NIOSH Physical & Chemical Analytical Method 1003 for charcoal tubes. The sampling rate used for the tetrachloroethylene quantitation was 28.3 cc/min with a recovery coefficient of 1.05 as provided by 3M.

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LABORATORY REPORT

TO: Dan McCaffery
ADDRESS: Envirocon, Inc.
P.O. Box 8243
Missoula, MT 59807

LAB NO.: 93-4523
DATE: 02/03/93 da

ORGANIC VAPOR MONITOR ANALYSIS

Monitor No.: WD 6111
Date Exposed: 01/11/93 @ 1500 to 01/25/93 @ 1520
I.D.: None
Temperature: N/A
Relative Humidity: N/A
Exposure Time: 20170 minutes
Sampled by: Dan McCaffery
Analysis date: 01/28/93

CAS No.	Constituent	μg/badge	$\mu g/m^3$	ppb
127-18-4	Tetrachloroethylene	<2.5	<4.2	<0.6

REMARKS: A 3M Brand Organic Vapor Monitor #3500 was used and was analyzed using techniques from NIOSH Physical & Chemical Analytical Method 1003 for charcoal tubes. The sampling rate used for the tetrachloroethylene quantitation was 28.3 cc/min with a recovery coefficient of 1.05 as provided by 3M.

NOTE: Analysis was confirmed by GC/MS due to sample matrix interference.

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LABORATORY REPORT

TO: Dan McCaffery
ADDRESS: Envirocon, Inc.
P.O. Box 8243
Missoula, MT 59807

LAB NO.: 93-4524
DATE: 02/03/93 da

ORGANIC VAPOR MONITOR ANALYSIS

Monitor No.:	WD 6203
Date Exposed:	01/11/93 @ 1545 to 01/25/93 @ 1530
I.D.:	None
Temperature:	N/A
Relative Humidity:	N/A
Exposure Time:	20154 minutes
Sampled by:	Dan McCaffery
Analysis date:	01/28/93

CAS No.	Constituent	μg/badge	μg/m^3	ppb
127-18-4	Tetrachloroethylene	<2.5	<4.2	<0.6

REMARKS: A 3M Brand Organic Vapor Monitor #3500 was used and was analyzed using techniques from NIOSH Physical & Chemical Analytical Method 1003 for charcoal tubes. The sampling rate used for the tetrachloroethylene quantitation was 28.3 cc/min with a recovery coefficient of 1.05 as provided by 3M.

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LABORATORY REPORT

TO: Dan McCaffery
ADDRESS: Envirocon, Inc.
P.O. Box 8243
Missoula, MT 59807

LAB NO.: 93-4525
DATE: 02/03/93 da

ORGANIC VAPOR MONITOR ANALYSIS

Monitor No.: WD 6221
Date Exposed: 01/11/93 @ 1510 to 01/25/93 @ 1520
I.D.: None
Temperature: N/A
Relative Humidity: N/A
Exposure Time: 20180 minutes
Sampled by: Dan McCaffery
Analysis date: 01/29/93

CAS No.	Constituent	µg/badge	µg/m³	ppb
127-18-4	Tetrachloroethylene	<2.5	<4.2	<0.6

REMARKS: A 3M Brand Organic Vapor Monitor #3500 was used and was analyzed using techniques from NIOSH Physical & Chemical Analytical Method 1003 for charcoal tubes. The sampling rate used for the tetrachloroethylene quantitation was 28.3 cc/min with a recovery coefficient of 1.05 as provided by 3M.

NOTE: Analysis was confirmed by GC/MS due to sample matrix interference.

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LABORATORY REPORT

TO: Dan McCaffery
ADDRESS: Envirocon, Inc.
P.O. Box 8243
Missoula, MT 59807

LAB NO.: 93-4526
DATE: 02/03/93 da

ORGANIC VAPOR MONITOR ANALYSIS

Monitor No.:	WK 4476
Date Exposed:	01/12/93 @ 1040 to 01/26/93 @ 0715
I.D.:	None
Temperature:	N/A
Relative Humidity:	N/A
Exposure Time:	20075 minutes
Sampled by:	Dan McCaffery
Analysis date:	01/29/93

CAS No.	Constituent	µg/badge	µg/m^3	ppb
127-18-4	Tetrachloroethylene	<2.5	<4.2	<0.6

REMARKS: A 3M Brand Organic Vapor Monitor #3500 was used and was analyzed using techniques from NIOSH Physical & Chemical Analytical Method 1003 for charcoal tubes. The sampling rate used for the tetrachloroethylene quantitation was 28.3 cc/min with a recovery coefficient of 1.05 as provided by 3M.

NOTE: Analysis was confirmed by GC/MS due to sample matrix interference.

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LABORATORY REPORT

TO: Dan McCaffery
ADDRESS: Envirocon, Inc.
P.O. Box 8243
Missoula, MT 59807

LAB NO.: 93-4527
DATE: 02/03/93 da

ORGANIC VAPOR MONITOR ANALYSIS

Monitor No.:	WK 4474
Date Exposed:	01/12/93 @ 0910 to 01/26/93 @ 0830
I.D.:	None
Temperature:	N/A
Relative Humidity:	N/A
Exposure Time:	20120 minutes
Sampled by:	Dan McCaffery
Analysis date:	01/29/93

CAS No.	Constituent	μg/badge	μg/m³	ppb
127-18-4	Tetrachloroethylene	<2.5	<4.2	<0.6

REMARKS: A 3M Brand Organic Vapor Monitor #3500 was used and was analyzed using techniques from NIOSH Physical & Chemical Analytical Method 1003 for charcoal tubes. The sampling rate used for the tetrachloroethylene quantitation was 28.3 cc/min with a recovery coefficient of 1.05 as provided by 3M.

NOTE: Analysis was confirmed by GC/MS due to sample matrix interference.

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LABORATORY REPORT

TO: Dan McCaffery
ADDRESS: Envirocon, Inc.
P.O. Box 8243
Missoula, MT 59807

LAB NO.: 93-4528
DATE: 02/03/93 da

ORGANIC VAPOR MONITOR ANALYSIS

Monitor No.:	WK 4423
Date Exposed:	01/12/93 @ 1440 to 01/26/93 @ 0940
I.D.:	None
Temperature:	N/A
Relative Humidity:	N/A
Exposure Time:	19880 minutes
Sampled by:	Dan McCaffery
Analysis date:	01/29/93

CAS No.	Constituent	μg/badge	μg/m³	ppb
127-18-4	Tetrachloroethylene	<2.5	<4.2	<0.6

REMARKS: A 3M Brand Organic Vapor Monitor #3500 was used and was analyzed using techniques from NIOSH Physical & Chemical Analytical Method 1003 for charcoal tubes. The sampling rate used for the tetrachloroethylene quantitation was 28.3 cc/min with a recovery coefficient of 1.05 as provided by 3M.

NOTE: Analysis was confirmed by GC/MS due to sample matrix interference.

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LABORATORY REPORT

TO: Dan McCaffery
ADDRESS: Envirocon, Inc.
P.O. Box 8243
Missoula, MT 59807

LAB NO.: 93-4529
DATE: 02/03/93 da

ORGANIC VAPOR MONITOR ANALYSIS

Monitor No.: WK 4573
Date Exposed: 01/12/93 @ 1440 to 01/26/93 @ 0940
I.D.: None
Temperature: N/A
Relative Humidity: N/A
Exposure Time: 19865 minutes
Sampled by: Dan McCaffery
Analysis date: 01/28/93

CAS No.	Constituent	µg/badge	µg/m^3	ppb
127-18-4	Tetrachloroethylene	<2.5	<4.2	<0.6

REMARKS: A 3M Brand Organic Vapor Monitor #3500 was used and was analyzed using techniques from NIOSH Physical & Chemical Analytical Method 1003 for charcoal tubes. The sampling rate used for the tetrachloroethylene quantitation was 28.3 cc/min with a recovery coefficient of 1.05 as provided by 3M.

NOTE: Analysis was confirmed by GC/MS due to sample matrix interference.

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LABORATORY REPORT

TO:	Dan McCaffery	**LAB NO.:**	93-4530
ADDRESS:	Envirocon, Inc. P.O. Box 8243 Missoula, MT 59807	**DATE:**	02/03/93 da

ORGANIC VAPOR MONITOR ANALYSIS

Monitor No.:	WK 4589
Date Exposed:	01/12/93 @ 0950 to 01/26/93 @ 0845
I.D.:	None
Temperature:	N/A
Relative Humidity:	N/A
Exposure Time:	20095 minutes
Sampled by:	Dan McCaffery
Analysis date:	01/29/93

CAS No.	Constituent	µg/badge	µg/m³	ppb
127-18-4	Tetrachloroethylene	<2.5	<4.2	<0.6

REMARKS: A 3M Brand Organic Vapor Monitor #3500 was used and was analyzed using techniques from NIOSH Physical & Chemical Analytical Method 1003 for charcoal tubes. The sampling rate used for the tetrachloroethylene quantitation was 28.3 cc/min with a recovery coefficient of 1.05 as provided by 3M.

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LABORATORY REPORT

TO: Dan McCaffery
ADDRESS: Envirocon, Inc.
P.O. Box 8243
Missoula, MT 59807

LAB NO.: 93-4531
DATE: 02/03/93 da

ORGANIC VAPOR MONITOR ANALYSIS

Monitor No.: WK 4581
Date Exposed: 01/12/93 @ 1050 to 01/26/93 @ 0915
I.D.: None
Temperature: N/A
Relative Humidity: N/A
Exposure Time: 20065 minutes
Sampled by: Dan McCaffery
Analysis date: 01/29/93

CAS No.	Constituent	µg/badge	µg/m^3	ppb
127-18-4	Tetrachloroethylene	<2.5	<4.2	<0.6

REMARKS: A 3M Brand Organic Vapor Monitor #3500 was used and was analyzed using techniques from NIOSH Physical & Chemical Analytical Method 1003 for charcoal tubes. The sampling rate used for the tetrachloroethylene quantitation was 28.3 cc/min with a recovery coefficient of 1.05 as provided by 3M.

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LABORATORY REPORT

TO: Dan McCaffery
ADDRESS: Envirocon, Inc.
P.O. Box 8243
Missoula, MT 59807

LAB NO.: 93-4532
DATE: 02/03/93 da

ORGANIC VAPOR MONITOR ANALYSIS

Monitor No.:	WK 4510
Date Exposed:	01/12/93 @ 0920 to 01/26/93 @ 0830
I.D.:	None
Temperature:	N/A
Relative Humidity:	N/A
Exposure Time:	20110 minutes
Sampled by:	Dan McCaffery
Analysis date:	01/29/93

CAS No.	Constituent	µg/badge	µg/m^3	ppb
127-18-4	Tetrachloroethylene	<2.5	<4.2	<0.6

REMARKS: A 3M Brand Organic Vapor Monitor #3500 was used and was analyzed using techniques from NIOSH Physical & Chemical Analytical Method 1003 for charcoal tubes. The sampling rate used for the tetrachloroethylene quantitation was 28.3 cc/min with a recovery coefficient of 1.05 as provided by 3M.

NOTE: Analysis was confirmed by GC/MS due to sample matrix interference.

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LABORATORY REPORT

TO: Dan McCaffery
ADDRESS: Envirocon, Inc.
P.O. Box 8243
Missoula, MT 59807

LAB NO.: 93-4533
DATE: 02/03/93 da

ORGANIC VAPOR MONITOR ANALYSIS

Monitor No.:	WK 4635
Date Exposed:	01/12/93 @ 0840 to 01/26/93 @ 0825
I.D.:	None
Temperature:	N/A
Relative Humidity:	N/A
Exposure Time:	20145 minutes
Sampled by:	Dan McCaffery
Analysis date:	01/29/93

CAS No.	Constituent	µg/badge	µg/m^3	ppb
127-18-4	Tetrachloroethylene	<2.5	<4.2	<0.6

REMARKS: A 3M Brand Organic Vapor Monitor #3500 was used and was analyzed using techniques from NIOSH Physical & Chemical Analytical Method 1003 for charcoal tubes. The sampling rate used for the tetrachloroethylene quantitation was 28.3 cc/min with a recovery coefficient of 1.05 as provided by 3M.

NOTE: Analysis was confirmed by GC/MS due to sample matrix interference.

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LABORATORY REPORT

TO: Dan McCaffery
ADDRESS: Envirocon, Inc.
P.O. Box 8243
Missoula, MT 59807

LAB NO.: 93-4534
DATE: 02/03/93 da

ORGANIC VAPOR MONITOR ANALYSIS

Monitor No.:	WK 4698
Date Exposed:	01/12/93 @ 1340 to 01/26/93 @ 0925
I.D.:	None
Temperature:	N/A
Relative Humidity:	N/A
Exposure Time:	19905 minutes
Sampled by:	Dan McCaffery
Analysis date:	01/29/93

CAS No.	Constituent	µg/badge	µg/m^3	ppb
127-18-4	Tetrachloroethylene	<2.5	<4.2	<0.6

REMARKS: A 3M Brand Organic Vapor Monitor #3500 was used and was analyzed using techniques from NIOSH Physical & Chemical Analytical Method 1003 for charcoal tubes. The sampling rate used for the tetrachloroethylene quantitation was 28.3 cc/min with a recovery coefficient of 1.05 as provided by 3M.

NOTE: Analysis was confirmed by GC/MS due to sample matrix interference.

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LABORATORY REPORT

TO: Dan McCaffery
ADDRESS: Envirocon, Inc.
P.O. Box 8243
Missoula, MT 59807

LAB NO.: 93-4535
DATE: 02/03/93 da

ORGANIC VAPOR MONITOR ANALYSIS

Monitor No.:	WK 4671
Date Exposed:	01/12/93 @ 0930 to 01/26/93 @ 0845
I.D.:	None
Temperature:	N/A
Relative Humidity:	N/A
Exposure Time:	20115 minutes
Sampled by:	Dan McCaffery
Analysis date:	01/29/93

CAS No.	Constituent	µg/badge	µg/m^3	ppb
127-18-4	Tetrachloroethylene	<2.5	<4.2	<0.6

REMARKS: A 3M Brand Organic Vapor Monitor #3500 was used and was analyzed using techniques from NIOSH Physical & Chemical Analytical Method 1003 for charcoal tubes. The sampling rate used for the tetrachloroethylene quantitation was 28.3 cc/min with a recovery coefficient of 1.05 as provided by 3M.

NOTE: Analysis was confirmed by GC/MS due to sample matrix interference.

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LABORATORY REPORT

TO: Dan McCaffery
ADDRESS: Envirocon, Inc.
P.O. Box 8243
Missoula, MT 59807

LAB NO.: 93-4536
DATE: 02/03/93 da

ORGANIC VAPOR MONITOR ANALYSIS

Monitor No.:	WK 4786
Date Exposed:	01/12/93 @ 1345 to 01/26/93 @ 0925
I.D.:	None
Temperature:	N/A
Relative Humidity:	N/A
Exposure Time:	19900 minutes
Sampled by:	Dan McCaffery
Analysis date:	01/29/93

CAS No.	Constituent	μg/badge	μg/m^3	ppb
127-18-4	Tetrachloroethylene	<2.5	<4.2	<0.6

REMARKS: A 3M Brand Organic Vapor Monitor #3500 was used and was analyzed using techniques from NIOSH Physical & Chemical Analytical Method 1003 for charcoal tubes. The sampling rate used for the tetrachloroethylene quantitation was 28.3 cc/min with a recovery coefficient of 1.05 as provided by 3M.

NOTE: Analysis was confirmed by GC/MS due to sample matrix interference.

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LABORATORY REPORT

TO: Dan McCaffery
ADDRESS: Envirocon, Inc.
P.O. Box 8243
Missoula, MT 59807

LAB NO.: 93-4537
DATE: 02/03/93 da

ORGANIC VAPOR MONITOR ANALYSIS

Monitor No.:	WK 4776
Date Exposed:	01/12/93 @ 1345 to 01/26/93 @ 0925
I.D.:	None
Temperature:	N/A
Relative Humidity:	N/A
Exposure Time:	19900 minutes
Sampled by:	Dan McCaffery
Analysis date:	01/29/93

CAS No.	Constituent	µg/badge	µg/m^3	ppb
127-18-4	Tetrachloroethylene	<2.5	<4.2	<0.6

REMARKS: A 3M Brand Organic Vapor Monitor #3500 was used and was analyzed using techniques from NIOSH Physical & Chemical Analytical Method 1003 for charcoal tubes. The sampling rate used for the tetrachloroethylene quantitation was 28.3 cc/min with a recovery coefficient of 1.05 as provided by 3M.

NOTE: Analysis was confirmed by GC/MS due to sample matrix interference.

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LABORATORY REPORT

TO: Dan McCaffery
ADDRESS: Envirocon, Inc.
P.O. Box 8243
Missoula, MT 59807

LAB NO.: 93-4538
DATE: 02/03/93 da

ORGANIC VAPOR MONITOR ANALYSIS

Monitor No.: WK 4850
Date Exposed: 01/12/93 @ 1105 to 01/25/93 @ 1555
I.D.: None
Temperature: N/A
Relative Humidity: N/A
Exposure Time: 19005 minutes
Sampled by: Dan McCaffery
Analysis date: 01/29/93

CAS No.	Constituent	µg/badge	$\mu g/m^3$	ppb
127-18-4	Tetrachloroethylene	<2.5	<4.5	<0.7

REMARKS: A 3M Brand Organic Vapor Monitor #3500 was used and was analyzed using techniques from NIOSH Physical & Chemical Analytical Method 1003 for charcoal tubes. The sampling rate used for the tetrachloroethylene quantitation was 28.3 cc/min with a recovery coefficient of 1.05 as provided by 3M.

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LABORATORY REPORT

TO: Dan McCaffery
ADDRESS: Envirocon, Inc.
P.O. Box 8243
Missoula, MT 59807

LAB NO.: 93-4599
DATE: 02/03/93 da

ORGANIC VAPOR MONITOR ANALYSIS

Monitor No.:	WK 4500
Date Exposed:	01/12/93 @ 1615 to 01/26/93 @ 1440
I.D.:	None
Temperature:	N/A
Relative Humidity:	N/A
Exposure Time:	20065 minutes
Sampled by:	Dan McCaffery
Analysis date:	01/29/93

CAS No.	Constituent	µg/badge	µg/m^3	ppb
127-18-4	Tetrachloroethylene	<2.5	<4.2	<0.6

REMARKS: A 3M Brand Organic Vapor Monitor #3500 was used and was analyzed using techniques from NIOSH Physical & Chemical Analytical Method 1003 for charcoal tubes. The sampling rate used for the tetrachloroethylene quantitation was 28.3 cc/min with a recovery coefficient of 1.05 as provided by 3M.

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LABORATORY REPORT

TO: Dan McCaffery
ADDRESS: Envirocon, Inc.
P.O. Box 8243
Missoula, MT 59807

LAB NO.: 93-4600
DATE: 02/03/93 da

ORGANIC VAPOR MONITOR ANALYSIS

Monitor No.:	WK 4536
Date Exposed:	01/12/93 @ 1550 to 01/26/93 @ 1425
I.D.:	None
Temperature:	N/A
Relative Humidity:	N/A
Exposure Time:	20075 minutes
Sampled by:	Dan McCaffery
Analysis date:	01/31/93

CAS No.	Constituent	µg/badge	µg/m³	ppb
127-18-4	Tetrachloroethylene	<2.5	<4.2	<0.6

REMARKS: A 3M Brand Organic Vapor Monitor #3500 was used and was analyzed using techniques from NIOSH Physical & Chemical Analytical Method 1003 for charcoal tubes. The sampling rate used for the tetrachloroethylene quantitation was 28.3 cc/min with a recovery coefficient of 1.05 as provided by 3M.

NOTE: Analysis was confirmed by GC/MS due to sample matrix interference.

ENERGY LABORATORIES

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LABORATORY REPORT

TO: Dan McCaffery
ADDRESS: Envirocon, Inc.
P.O. Box 8243
Missoula, MT 59807

LAB NO.: 93-4601
DATE: 02/03/93 da

ORGANIC VAPOR MONITOR ANALYSIS

Monitor No.: WK 4438
Date Exposed: 01/13/93 @ 1440 to 01/26/93 @ 0126
I.D.: None
Temperature: N/A
Relative Humidity: N/A
Exposure Time: 18820 minutes
Sampled by: Dan McCaffery
Analysis date: 01/31/93

CAS No.	Constituent	µg/badge	µg/m³	ppb
127-18-4	Tetrachloroethylene	<2.5	<4.5	<0.7

REMARKS: A 3M Brand Organic Vapor Monitor #3500 was used and was analyzed using techniques from NIOSH Physical & Chemical Analytical Method 1003 for charcoal tubes. The sampling rate used for the tetrachloroethylene quantitation was 28.3 cc/min with a recovery coefficient of 1.05 as provided by 3M.

NOTE: Analysis was confirmed by GC/MS due to sample matrix interference.

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LABORATORY REPORT

TO: Dan McCaffery
ADDRESS: Envirocon, Inc.
P.O. Box 8243
Missoula, MT 59807

LAB NO.: 93-4602
DATE: 02/03/93 da

ORGANIC VAPOR MONITOR ANALYSIS

Monitor No.:	WK 4755
Date Exposed:	01/12/93 @ 1650
I.D.:	None
Temperature:	N/A
Relative Humidity:	N/A
Exposure Time:	20035 minutes
Sampled by:	Dan McCaffery
Analysis date:	01/31/93

CAS No.	Constituent	µg/badge	µg/m³	ppb
127-18-4	Tetrachloroethylene	<2.5	<4.2	<0.6

REMARKS: A 3M Brand Organic Vapor Monitor #3500 was used and was analyzed using techniques from NIOSH Physical & Chemical Analytical Method 1003 for charcoal tubes. The sampling rate used for the tetrachloroethylene quantitation was 28.3 cc/min with a recovery coefficient of 1.05 as provided by 3M.

ENERGY LABORATORIES

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FAX (406) 252-6069 • 1-800-735-4489

LABORATORY REPORT

TO:	Dan McCaffery	LAB NO.:	93-4603
ADDRESS:	Envirocon, Inc. P.O. Box 8243 Missoula, MT 59807	DATE:	02/03/93 da

ORGANIC VAPOR MONITOR ANALYSIS

Monitor No.:	WK 4766
Date Exposed:	01/12/93 @ 1420 to 01/26/93
I.D.:	None
Temperature:	N/A
Relative Humidity:	N/A
Exposure Time:	20150 minutes
Sampled by:	Dan McCaffery
Analysis date:	01/31/93

CAS No.	Constituent	µg/badge	µg/m^3	ppb
127-18-4	Tetrachloroethylene	<2.5	<4.2	<0.6

REMARKS: A 3M Brand Organic Vapor Monitor #3500 was used and was analyzed using techniques from NIOSH Physical & Chemical Analytical Method 1003 for charcoal tubes. The sampling rate used for the tetrachloroethylene quantitation was 28.3 cc/min with a recovery coefficient of 1.05 as provided by 3M.

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LABORATORY REPORT

TO: Dan McCaffery
ADDRESS: Envirocon, Inc.
P.O. Box 8243
Missoula, MT 59807

LAB NO.: 93-4604
DATE: 02/03/93 da

ORGANIC VAPOR MONITOR ANALYSIS

Monitor No.: WK 4721
Date Exposed: 01/12/93 @ 1520 to 01/26/93 @ 1500
I.D.: None
Temperature: N/A
Relative Humidity: N/A
Exposure Time: 20140 minutes
Sampled by: Dan McCaffery
Analysis date: 01/31/93

CAS No.	Constituent	μg/badge	μg/m^3	ppb
127-18-4	Tetrachloroethylene	<2.5	<4.2	<0.6

REMARKS: A 3M Brand Organic Vapor Monitor #3500 was used and was analyzed using techniques from NIOSH Physical & Chemical Analytical Method 1003 for charcoal tubes. The sampling rate used for the tetrachloroethylene quantitation was 28.3 cc/min with a recovery coefficient of 1.05 as provided by 3M.

NOTE: Analysis was confirmed by GC/MS due to sample matrix interference.

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LABORATORY REPORT

TO: Dan McCaffery
ADDRESS: Envirocon, Inc.
P.O. Box 8243
Missoula, MT 59807

LAB NO.: 93-4605
DATE: 02/03/93 da

ORGANIC VAPOR MONITOR ANALYSIS

Monitor No.:	WK 4422
Date Exposed:	01/12/93 @ 1545 to 01/26/93 @ 1425
I.D.:	None
Temperature:	N/A
Relative Humidity:	N/A
Exposure Time:	20080 minutes
Sampled by:	Dan McCaffery
Analysis date:	01/31/93

CAS No.	Constituent	µg/badge	µg/m^3	ppb
127-18-4	Tetrachloroethylene	<2.5	<4.2	<0.6

REMARKS: A 3M Brand Organic Vapor Monitor #3500 was used and was analyzed using techniques from NIOSH Physical & Chemical Analytical Method 1003 for charcoal tubes. The sampling rate used for the tetrachloroethylene quantitation was 28.3 cc/min with a recovery coefficient of 1.05 as provided by 3M.

NOTE: Analysis was confirmed by GC/MS due to sample matrix interference.

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LABORATORY REPORT

TO: Dan McCaffery
ADDRESS: Envirocon, Inc.
P.O. Box 8243
Missoula, MT 59807

LAB NO.: 93-4606
DATE: 02/03/93 da

ORGANIC VAPOR MONITOR ANALYSIS

Monitor No.: WK 4641
Date Exposed: 01/12/93 @ 1510 to 01/26/93 @ 1500
I.D.: None
Temperature: N/A
Relative Humidity: N/A
Exposure Time: 20150 minutes
Sampled by: Dan McCaffery
Analysis date: 01/31/93

CAS No.	Constituent	µg/badge	µg/m^3	ppb
127-18-4	Tetrachloroethylene	<2.5	<4.2	<0.6

REMARKS: A 3M Brand Organic Vapor Monitor #3500 was used and was analyzed using techniques from NIOSH Physical & Chemical Analytical Method 1003 for charcoal tubes. The sampling rate used for the tetrachloroethylene quantitation was 28.3 cc/min with a recovery coefficient of 1.05 as provided by 3M.

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LABORATORY REPORT

TO: Dan McCaffery
ADDRESS: Envirocon, Inc.
P.O. Box 8243
Missoula, MT 59807

LAB NO.: 93-4607
DATE: 02/03/93 da

ORGANIC VAPOR MONITOR ANALYSIS

Monitor No.:	WK 4661
Date Exposed:	01/12/93 @ 1620 to 01/26/93 @ 1440
I.D.:	None
Temperature:	N/A
Relative Humidity:	N/A
Exposure Time:	20060 minutes
Sampled by:	Dan McCaffery
Analysis date:	01/31/93

CAS No.	Constituent	μg/badge	$\mu g/m^3$	ppb
127-18-4	Tetrachloroethylene	<2.5	<4.2	<0.6

REMARKS: A 3M Brand Organic Vapor Monitor #3500 was used and was analyzed using techniques from NIOSH Physical & Chemical Analytical Method 1003 for charcoal tubes. The sampling rate used for the tetrachloroethylene quantitation was 28.3 cc/min with a recovery coefficient of 1.05 as provided by 3M.

NOTE: Analysis was confirmed by GC/MS due to sample matrix interference.

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LABORATORY REPORT

TO: Dan McCaffery
ADDRESS: Envirocon, Inc.
P.O. Box 8243
Missoula, MT 59807

LAB NO.: 93-4608
DATE: 02/03/93 da

ORGANIC VAPOR MONITOR ANALYSIS

Monitor No.: WK 4878
Date Exposed: 01/13/93 @ 1710 to 01/26/93 @ 1550
I.D.: None
Temperature: N/A
Relative Humidity: N/A
Exposure Time: 18640 minutes
Sampled by: Dan McCaffery
Analysis date: 01/31/93

CAS No.	Constituent	µg/badge	µg/m^3	ppb
127-18-4	Tetrachloroethylene	2.8	5.0	0.7

REMARKS: A 3M Brand Organic Vapor Monitor #3500 was used and was analyzed using techniques from NIOSH Physical & Chemical Analytical Method 1003 for charcoal tubes. The sampling rate used for the tetrachloroethylene quantitation was 28.3 cc/min with a recovery coefficient of 1.05 as provided by 3M.

NOTE: Analytical value confirmed by GC/MS.

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LABORATORY REPORT

TO: Dan McCaffery
ADDRESS: Envirocon, Inc.
P.O. Box 8243
Missoula, MT 59807

LAB NO.: 93-4609
DATE: 02/03/93 da

ORGANIC VAPOR MONITOR ANALYSIS

Monitor No.: WK 4593
Date Exposed: 01/12/93 @ 1025 to 01/26/93 @ 1600
I.D.: None
Temperature: N/A
Relative Humidity: N/A
Exposure Time: 20495 minutes
Sampled by: Dan McCaffery
Analysis date: 01/31/93

CAS No.	Constituent	µg/badge	µg/m^3	ppb
127-18-4	Tetrachloroethylene	<2.5	<4.2	<0.6

REMARKS: A 3M Brand Organic Vapor Monitor #3500 was used and was analyzed using techniques from NIOSH Physical & Chemical Analytical Method 1003 for charcoal tubes. The sampling rate used for the tetrachloroethylene quantitation was 28.3 cc/min with a recovery coefficient of 1.05 as provided by 3M.

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LABORATORY REPORT

TO: Dan McCaffery
ADDRESS: Envirocon, Inc.
P.O. Box 8243
Missoula, MT 59807

LAB NO.: 93-4610
DATE: 02/03/93 da

ORGANIC VAPOR MONITOR ANALYSIS

Monitor No.: WK 4600
Date Exposed: 01/12/93 @ 1010 to 01/26/93 @ 1600
I.D.: None
Temperature: N/A
Relative Humidity: N/A
Exposure Time: 20510 minutes
Sampled by: Dan McCaffery
Analysis date: 01/31/93

CAS No.	Constituent	µg/badge	µg/m³	ppb
127-18-4	Tetrachloroethylene	4.1	6.8	1.0

REMARKS: A 3M Brand Organic Vapor Monitor #3500 was used and was analyzed using techniques from NIOSH Physical & Chemical Analytical Method 1003 for charcoal tubes. The sampling rate used for the tetrachloroethylene quantitation was 28.3 cc/min with a recovery coefficient of 1.05 as provided by 3M.

NOTE: Analytical value confirmed by GC/MS.

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LABORATORY REPORT

TO:	Dan McCaffery	**LAB NO.:**	93-4611
ADDRESS:	Envirocon, Inc. P.O. Box 8243 Missoula, MT 59807	**DATE:**	02/03/93 da

ORGANIC VAPOR MONITOR ANALYSIS

Monitor No.:	WK 4649
Date Exposed:	01/13/93 @ 1700 to 01/26/93 @ 1550
I.D.:	None
Temperature:	N/A
Relative Humidity:	N/A
Exposure Time:	18650 minutes
Sampled by:	Dan McCaffery
Analysis date:	01/31/93

CAS No.	Constituent	μg/badge	μg/m^3	ppb
127-18-4	Tetrachloroethylene	2.5	4.5	0.7

REMARKS: A 3M Brand Organic Vapor Monitor #3500 was used and was analyzed using techniques from NIOSH Physical & Chemical Analytical Method 1003 for charcoal tubes. The sampling rate used for the tetrachloroethylene quantitation was 28.3 cc/min with a recovery coefficient of 1.05 as provided by 3M.

NOTE: The reported value was taken from GC/MS quantitation due to sample matrix interference.

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LABORATORY REPORT

TO: Dan McCaffery
ADDRESS: Envirocon, Inc.
P.O. Box 8243
Missoula, MT 59807

LAB NO.: 93-4612
DATE: 02/03/93 da

ORGANIC VAPOR MONITOR ANALYSIS

Monitor No.: WK 4242
Date Exposed: 01/13/93 @ 1000 to 01/26/93 @ 1520
I.D.: None
Temperature: N/A
Relative Humidity: N/A
Exposure Time: 19047 minutes
Sampled by: Dan McCaffery
Analysis date: 01/31/93

CAS No.	Constituent	µg/badge	$\mu g/m^3$	ppb
127-18-4	Tetrachloroethylene	<2.5	<4.5	<0.7

REMARKS: A 3M Brand Organic Vapor Monitor #3500 was used and was analyzed using techniques from NIOSH Physical & Chemical Analytical Method 1003 for charcoal tubes. The sampling rate used for the tetrachloroethylene quantitation was 28.3 cc/min with a recovery coefficient of 1.05 as provided by 3M.

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LABORATORY REPORT

TO:	Dan McCaffery	**LAB NO.:**	93-4613
ADDRESS:	Envirocon, Inc. P.O. Box 8243 Missoula, MT 59807	**DATE:**	02/05/93 da

ORGANIC VAPOR MONITOR ANALYSIS

Monitor No.:	WK 4847
Date Exposed:	01/12/93 @ 1320 to 01/26/93 @ 1320
I.D.:	None
Temperature:	N/A
Relative Humidity:	N/A
Exposure Time:	20150 minutes
Sampled by:	Dan McCaffery
Analysis date:	01/31/93

CAS No.	Constituent	μg/badge	μg/m^3	ppb
127-18-4	Tetrachloroethylene	<2.5	<4.2	<0.6

REMARKS: A 3M Brand Organic Vapor Monitor #3500 was used and was analyzed using techniques from NIOSH Physical & Chemical Analytical Method 1003 for charcoal tubes. The sampling rate used for the tetrachloroethylene quantitation was 28.3 cc/min with a recovery coefficient of 1.05 as provided by 3M.

NOTE: Analysis was confirmed by GC/MS due to sample matrix interference.

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LABORATORY REPORT

TO: Dan McCaffery
ADDRESS: Envirocon, Inc.
P.O. Box 8243
Missoula, MT 59807

LAB NO.: 93-4614
DATE: 02/03/93 da

ORGANIC VAPOR MONITOR ANALYSIS

Monitor No.:	WK 4448
Date Exposed:	01/12/93 @ 1420 to 01/26/93 @ 1410
I.D.:	None
Temperature:	N/A
Relative Humidity:	N/A
Exposure Time:	20150 minutes
Sampled by:	Dan McCaffery
Analysis date:	01/31/93

CAS No.	Constituent	µg/badge	µg/m^3	ppb
127-18-4	Tetrachloroethylene	<2.5	<4.2	<0.6

REMARKS: A 3M Brand Organic Vapor Monitor #3500 was used and was analyzed using techniques from NIOSH Physical & Chemical Analytical Method 1003 for charcoal tubes. The sampling rate used for the tetrachloroethylene quantitation was 28.3 cc/min with a recovery coefficient of 1.05 as provided by 3M.

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LABORATORY REPORT

TO: Dan McCaffery
ADDRESS: Envirocon, Inc.
P.O. Box 8243
Missoula, MT 59807

LAB NO.: 93-4615
DATE: 02/03/93 da

ORGANIC VAPOR MONITOR ANALYSIS

Monitor No.: WK 4303
Date Exposed: 01/13/93 @ 0955 to 01/26/93 @ 1527
I.D.: None
Temperature: N/A
Relative Humidity: N/A
Exposure Time: 19045 minutes
Sampled by: Dan McCaffery
Analysis date: 02/01/93

CAS No.	Constituent	µg/badge	$\mu g/m^3$	ppb
127-18-4	Tetrachloroethylene	<2.5	<4.5	<0.7

REMARKS: A 3M Brand Organic Vapor Monitor #3500 was used and was analyzed using techniques from NIOSH Physical & Chemical Analytical Method 1003 for charcoal tubes. The sampling rate used for the tetrachloroethylene quantitation was 28.3 cc/min with a recovery coefficient of 1.05 as provided by 3M.

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LABORATORY REPORT

TO: Dan McCaffery
ADDRESS: Envirocon, Inc.
P.O. Box 8243
Missoula, MT 59807

LAB NO.: 93-4616
DATE: 02/03/93 da

ORGANIC VAPOR MONITOR ANALYSIS

Monitor No.:	WK 4682
Date Exposed:	01/12/93 @ 1315 to 01/26/93 @ 1320
I.D.:	None
Temperature:	N/A
Relative Humidity:	N/A
Exposure Time:	20165 minutes
Sampled by:	Dan McCaffery
Analysis date:	02/01/93

CAS No.	Constituent	µg/badge	µg/m^3	ppb
127-18-4	Tetrachloroethylene	3.1	5.2	0.8

REMARKS: A 3M Brand Organic Vapor Monitor #3500 was used and was analyzed using techniques from NIOSH Physical & Chemical Analytical Method 1003 for charcoal tubes. The sampling rate used for the tetrachloroethylene quantitation was 28.3 cc/min with a recovery coefficient of 1.05 as provided by 3M.

NOTE: The reported value was taken from GC/MS quantitation due to sample matrix interference.

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LABORATORY REPORT

TO: Dan McCaffery
ADDRESS: Envirocon, Inc.
P.O. Box 8243
Missoula, MT 59807

LAB NO.: 93-4617
DATE: 02/03/93 da

ORGANIC VAPOR MONITOR ANALYSIS

Monitor No.: WK 4450
Date Exposed: 01/13/93 @ 1700 to 01/26/93 @ 1550
I.D.: None
Temperature: N/A
Relative Humidity: N/A
Exposure Time: 18640 minutes
Sampled by: Dan McCaffery
Analysis date: 02/01/93

CAS No.	Constituent	μg/badge	μg/m^3	ppb
127-18-4	Tetrachloroethylene	2.5	4.5	0.7

REMARKS: A 3M Brand Organic Vapor Monitor #3500 was used and was analyzed using techniques from NIOSH Physical & Chemical Analytical Method 1003 for charcoal tubes. The sampling rate used for the tetrachloroethylene quantitation was 28.3 cc/min with a recovery coefficient of 1.05 as provided by 3M.

NOTE: The reported value was taken from GC/MS quantitation due to sample matrix interference.

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LABORATORY REPORT

TO: Dan McCaffery
ADDRESS: Envirocon, Inc.
P.O. Box 8243
Missoula, MT 59807

LAB NO.: 93-4618
DATE: 02/03/93 da

ORGANIC VAPOR MONITOR ANALYSIS

Monitor No.:	WK 4456
Date Exposed:	01/12/93 @ 1410 to 01/26/93 @ 1410
I.D.:	None
Temperature:	N/A
Relative Humidity:	N/A
Exposure Time:	20160 minutes
Sampled by:	Dan McCaffery
Analysis date:	02/01/93

CAS No.	Constituent	μg/badge	μg/m^3	ppb
127-18-4	Tetrachloroethylene	<2.5	<4.2	<0.6

REMARKS: A 3M Brand Organic Vapor Monitor #3500 was used and was analyzed using techniques from NIOSH Physical & Chemical Analytical Method 1003 for charcoal tubes. The sampling rate used for the tetrachloroethylene quantitation was 28.3 cc/min with a recovery coefficient of 1.05 as provided by 3M.

NOTE: Analysis was confirmed by GC/MS due to sample matrix interference.

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LABORATORY REPORT

TO: Dan McCaffery
ADDRESS: Envirocon, Inc.
P.O. Box 8243
Missoula, MT 59807

LAB NO.: 93-4619
DATE: 02/03/93 da

ORGANIC VAPOR MONITOR ANALYSIS

Monitor No.: WK 4181
Date Exposed: 01/13/93 @ 1015 to 01/26/93 @ 1505
I.D.: None
Temperature: N/A
Relative Humidity: N/A
Exposure Time: 19010 minutes
Sampled by: Dan McCaffery
Analysis date: 02/01/93

CAS No.	Constituent	μg/badge	$\mu g/m^3$	ppb
127-18-4	Tetrachloroethylene	<2.5	<4.5	<0.7

REMARKS: A 3M Brand Organic Vapor Monitor #3500 was used and was analyzed using techniques from NIOSH Physical & Chemical Analytical Method 1003 for charcoal tubes. The sampling rate used for the tetrachloroethylene quantitation was 28.3 cc/min with a recovery coefficient of 1.05 as provided by 3M.

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LABORATORY REPORT

TO: Dan McCaffery
ADDRESS: Envirocon, Inc.
P.O. Box 8243
Missoula, MT 59807

LAB NO.: 93-4620
DATE: 02/05/93 da

ORGANIC VAPOR MONITOR ANALYSIS

Monitor No.: WK 4694
Date Exposed: 01/12/93 @ 1325 to 01/26/93 @ 1320
I.D.: None
Temperature: N/A
Relative Humidity: N/A
Exposure Time: 20145 minutes
Sampled by: Dan McCaffery
Analysis date: 02/01/93

CAS No.	Constituent	μg/badge	$\mu g/m^3$	ppb
127-18-4	Tetrachloroethylene	<2.5	<4.2	<0.6

REMARKS: A 3M Brand Organic Vapor Monitor #3500 was used and was analyzed using techniques from NIOSH Physical & Chemical Analytical Method 1003 for charcoal tubes. The sampling rate used for the tetrachloroethylene quantitation was 28.3 cc/min with a recovery coefficient of 1.05 as provided by 3M.

NOTE: Analysis was confirmed by GC/MS due to sample matrix interference.

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LABORATORY REPORT

TO: Dan McCaffery
ADDRESS: Envirocon, Inc.
P.O. Box 8243
Missoula, MT 59807

LAB NO.: 93-4621
DATE: 02/03/93 da

ORGANIC VAPOR MONITOR ANALYSIS

Monitor No.: WK 4245
Date Exposed: 01/13/93 @ 1015 to 01/26/93 @ 1505
I.D.: None
Temperature: N/A
Relative Humidity: N/A
Exposure Time: 19010 minutes
Sampled by: Dan McCaffery
Analysis date: 02/01/93

CAS No.	Constituent	µg/badge	µg/m^3	ppb
127-18-4	Tetrachloroethylene	<2.5	<4.5	<0.7

REMARKS: A 3M Brand Organic Vapor Monitor #3500 was used and was analyzed using techniques from NIOSH Physical & Chemical Analytical Method 1003 for charcoal tubes. The sampling rate used for the tetrachloroethylene quantitation was 28.3 cc/min with a recovery coefficient of 1.05 as provided by 3M.

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LABORATORY REPORT

TO: Dan McCaffery
ADDRESS: Envirocon, Inc.
P.O. Box 8243
Missoula, MT 59807

LAB NO.: 93-4622
DATE: 02/03/93 da

ORGANIC VAPOR MONITOR ANALYSIS

Monitor No.:	WK 4750
Date Exposed:	01/12/93 @ 1240 to 01/26/93 @ 1305
I.D.:	None
Temperature:	N/A
Relative Humidity:	N/A
Exposure Time:	20185 minutes
Sampled by:	Dan McCaffery
Analysis date:	02/01/93

CAS No.	Constituent	µg/badge	µg/m³	ppb
127-18-4	Tetrachloroethylene	<2.5	<4.2	<0.6

REMARKS: A 3M Brand Organic Vapor Monitor #3500 was used and was analyzed using techniques from NIOSH Physical & Chemical Analytical Method 1003 for charcoal tubes. The sampling rate used for the tetrachloroethylene quantitation was 28.3 cc/min with a recovery coefficient of 1.05 as provided by 3M.

ENERGY LABORATORIES

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LABORATORY REPORT

TO: Dan McCaffery
ADDRESS: Envirocon, Inc.
P.O. Box 8243
Missoula, MT 59807

LAB NO.: 93-4623
DATE: 02/03/93 da

ORGANIC VAPOR MONITOR ANALYSIS

Monitor No.:	WK 4831
Date Exposed:	01/13/93 @ 0840 to 01/27/93 @ 0900
I.D.:	None
Temperature:	N/A
Relative Humidity:	N/A
Exposure Time:	20180 minutes
Sampled by:	Dan McCaffery
Analysis date:	02/01/93

CAS No.	Constituent	μg/badge	μg/m^3	ppb
127-18-4	Tetrachloroethylene	<2.5	<4.2	<0.6

REMARKS: A 3M Brand Organic Vapor Monitor #3500 was used and was analyzed using techniques from NIOSH Physical & Chemical Analytical Method 1003 for charcoal tubes. The sampling rate used for the tetrachloroethylene quantitation was 28.3 cc/min with a recovery coefficient of 1.05 as provided by 3M.

ENERGY LABORATORIES

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P.O. BOX 30916 • 1107 SOUTH BROADWAY • BILLINGS, MT 59107-0916 • PHONE (406) 252-6325
FAX (406) 252-6069 • 1-800-735-4489

LABORATORY REPORT

TO: Dan McCaffery
ADDRESS: Envirocon, Inc.
P.O. Box 8243
Missoula, MT 59807

LAB NO.: 93-4624
DATE: 02/03/93 da

ORGANIC VAPOR MONITOR ANALYSIS

Monitor No.:	WK 4828
Date Exposed:	01/13/93 @ 0805 to 01/27/93 @ 0810
I.D.:	None
Temperature:	N/A
Relative Humidity:	N/A
Exposure Time:	20165 minutes
Sampled by:	Dan McCaffery
Analysis date:	02/01/93

CAS No.	Constituent	μg/badge	μg/m³	ppb
127-18-4	Tetrachloroethylene	<2.5	<4.2	<0.6

REMARKS: A 3M Brand Organic Vapor Monitor #3500 was used and was analyzed using techniques from NIOSH Physical & Chemical Analytical Method 1003 for charcoal tubes. The sampling rate used for the tetrachloroethylene quantitation was 28.3 cc/min with a recovery coefficient of 1.05 as provided by 3M.

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LABORATORY REPORT

TO: Dan McCaffery
ADDRESS: Envirocon, Inc.
P.O. Box 8243
Missoula, MT 59807

LAB NO.: 93-4625
DATE: 02/03/93 da

ORGANIC VAPOR MONITOR ANALYSIS

Monitor No.:	WK 4218
Date Exposed:	01/13/93 @ 1110 to 01/27/93 @ 1125
I.D.:	None
Temperature:	N/A
Relative Humidity:	N/A
Exposure Time:	20175 minutes
Sampled by:	Dan McCaffery
Analysis date:	02/01/93

CAS No.	Constituent	μg/badge	$\mu g/m^3$	ppb
127-18-4	Tetrachloroethylene	2.5	4.2	0.6

REMARKS: A 3M Brand Organic Vapor Monitor #3500 was used and was analyzed using techniques from NIOSH Physical & Chemical Analytical Method 1003 for charcoal tubes. The sampling rate used for the tetrachloroethylene quantitation was 28.3 cc/min with a recovery coefficient of 1.05 as provided by 3M.

NOTE: The reported value was taken from GC/MS quantitation due to sample matrix interference.

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LABORATORY REPORT

TO: Dan McCaffery
ADDRESS: Envirocon, Inc.
P.O. Box 8243
Missoula, MT 59807

LAB NO.: 93-4626
DATE: 02/03/93 da

ORGANIC VAPOR MONITOR ANALYSIS

Monitor No.:	WK 4688
Date Exposed:	01/13/93 @ 0830 to 01/27/93 @ 0900
I.D.:	None
Temperature:	N/A
Relative Humidity:	N/A
Exposure Time:	20190 minutes
Sampled by:	Dan McCaffery
Analysis date:	02/01/93

CAS No.	Constituent	µg/badge	µg/m^3	ppb
127-18-4	Tetrachloroethylene	<2.5	<4.2	<0.6

REMARKS: A 3M Brand Organic Vapor Monitor #3500 was used and was analyzed using techniques from NIOSH Physical & Chemical Analytical Method 1003 for charcoal tubes. The sampling rate used for the tetrachloroethylene quantitation was 28.3 cc/min with a recovery coefficient of 1.05 as provided by 3M.

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LABORATORY REPORT

TO: Dan McCaffery
ADDRESS: Envirocon, Inc.
P.O. Box 8243
Missoula, MT 59807

LAB NO.: 93-4627
DATE: 02/05/93 da

ORGANIC VAPOR MONITOR ANALYSIS

Monitor No.:	WK 4199
Date Exposed:	01/13/93 @ 0910 to 01/27/93 @ 0925
I.D.:	None
Temperature:	N/A
Relative Humidity:	N/A
Exposure Time:	20175 minutes
Sampled by:	Dan McCaffery
Analysis date:	02/01/93

CAS No.	Constituent	µg/badge	µg/m^3	ppb
127-18-4	Tetrachloroethylene	<2.5	<4.2	<0.6

REMARKS: A 3M Brand Organic Vapor Monitor #3500 was used and was analyzed using techniques from NIOSH Physical & Chemical Analytical Method 1003 for charcoal tubes. The sampling rate used for the tetrachloroethylene quantitation was 28.3 cc/min with a recovery coefficient of 1.05 as provided by 3M.

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LABORATORY REPORT

TO: Dan McCaffery
ADDRESS: Envirocon, Inc.
P.O. Box 8243
Missoula, MT 59807

LAB NO.: 93-4628
DATE: 02/05/93 da

ORGANIC VAPOR MONITOR ANALYSIS

Monitor No.: WK 4833
Date Exposed: 01/13/93 @ 0800 to 01/27/93 @ 0810
I.D.: None
Temperature: N/A
Relative Humidity: N/A
Exposure Time: 20170 minutes
Sampled by: Dan McCaffery
Analysis date: 02/01/93

CAS No.	Constituent	µg/badge	µg/m^3	ppb
127-18-4	Tetrachloroethylene	<2.5	<4.2	<0.6

REMARKS: A 3M Brand Organic Vapor Monitor #3500 was used and was analyzed using techniques from NIOSH Physical & Chemical Analytical Method 1003 for charcoal tubes. The sampling rate used for the tetrachloroethylene quantitation was 28.3 cc/min with a recovery coefficient of 1.05 as provided by 3M.

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LABORATORY REPORT

TO: Dan McCaffery
ADDRESS: Envirocon, Inc.
P.O. Box 8243
Missoula, MT 59807

LAB NO.: 93-4629
DATE: 02/03/93 da

ORGANIC VAPOR MONITOR ANALYSIS

Monitor No.: WK 4195
Date Exposed: 01/13/93 @ 1115 to 01/27/93 @ 1125
I.D.: None
Temperature: N/A
Relative Humidity: N/A
Exposure Time: 20170 minutes
Sampled by: Dan McCaffery
Analysis date: 02/01/93

CAS No.	Constituent	µg/badge	µg/m^3	ppb
127-18-4	Tetrachloroethylene	<2.5	<4.2	<0.6

REMARKS: A 3M Brand Organic Vapor Monitor #3500 was used and was analyzed using techniques from NIOSH Physical & Chemical Analytical Method 1003 for charcoal tubes. The sampling rate used for the tetrachloroethylene quantitation was 28.3 cc/min with a recovery coefficient of 1.05 as provided by 3M.

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LABORATORY REPORT

TO: Dan McCaffery
ADDRESS: Envirocon, Inc.
P.O. Box 8243
Missoula, MT 59807

LAB NO.: 93-4630
DATE: 02/03/93 da

ORGANIC VAPOR MONITOR ANALYSIS

Monitor No.:	WK 4818
Date Exposed:	01/12/93 @ 1710 to 01/26/93 @ 1715
I.D.:	None
Temperature:	N/A
Relative Humidity:	N/A
Exposure Time:	20165 minutes
Sampled by:	Dan McCaffery
Analysis date:	02/01/93

CAS No.	Constituent	μg/badge	μg/m^3	ppb
127-18-4	Tetrachloroethylene	8.4	14.0	2.1

REMARKS: A 3M Brand Organic Vapor Monitor #3500 was used and was analyzed using techniques from NIOSH Physical & Chemical Analytical Method 1003 for charcoal tubes. The sampling rate used for the tetrachloroethylene quantitation was 28.3 cc/min with a recovery coefficient of 1.05 as provided by 3M.

NOTE: Analytical value confirmed by GC/MS.

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LABORATORY REPORT

TO: Dan McCaffery
ADDRESS: Envirocon, Inc.
P.O. Box 8243
Missoula, MT 59807

LAB NO.: 93-4631
DATE: 02/03/93 da

ORGANIC VAPOR MONITOR ANALYSIS

Monitor No.:	WK 4749
Date Exposed:	01/13/93 @ 0905 to 01/27/93 @ 0925
I.D.:	None
Temperature:	N/A
Relative Humidity:	N/A
Exposure Time:	20180 minutes
Sampled by:	Dan McCaffery
Analysis date:	02/01/93

CAS No.	Constituent	µg/badge	µg/m³	ppb
127-18-4	Tetrachloroethylene	<2.5	<4.2	<0.6

REMARKS: A 3M Brand Organic Vapor Monitor #3500 was used and was analyzed using techniques from NIOSH Physical & Chemical Analytical Method 1003 for charcoal tubes. The sampling rate used for the tetrachloroethylene quantitation was 28.3 cc/min with a recovery coefficient of 1.05 as provided by 3M.

NOTE: Analysis was confirmed by GC/MS due to sample matrix interference.

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FAX (406) 252-6069 • 1-800-735-4489

LABORATORY REPORT

TO: Dan McCaffery
ADDRESS: Envirocon, Inc.
P.O. Box 8243
Missoula, MT 59807

LAB NO.: 93-4632
DATE: 02/03/93 da

ORGANIC VAPOR MONITOR ANALYSIS

Monitor No.: WK 4168
Date Exposed: 01/13/93 @ 1140 to 01/27/93 @ 1105
I.D.: None
Temperature: N/A
Relative Humidity: N/A
Exposure Time: 20125 minutes
Sampled by: Dan McCaffery
Analysis date: 02/01/93

CAS No.	Constituent	μg/badge	μg/m^3	ppb
127-18-4	Tetrachloroethylene	<2.5	<4.2	<0.6

REMARKS: A 3M Brand Organic Vapor Monitor #3500 was used and was analyzed using techniques from NIOSH Physical & Chemical Analytical Method 1003 for charcoal tubes. The sampling rate used for the tetrachloroethylene quantitation was 28.3 cc/min with a recovery coefficient of 1.05 as provided by 3M.

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LABORATORY REPORT

TO: Dan McCaffery
ADDRESS: Envirocon, Inc.
P.O. Box 8243
Missoula, MT 59807

LAB NO.: 93-4633
DATE: 02/03/93 da

ORGANIC VAPOR MONITOR ANALYSIS

Monitor No.:	WK 4827
Date Exposed:	01/13/93 @ 0735 to 01/27/93 @ 0755
I.D.:	None
Temperature:	N/A
Relative Humidity:	N/A
Exposure Time:	20180 minutes
Sampled by:	Dan McCaffery
Analysis date:	02/01/93

CAS No.	Constituent	µg/badge	µg/m³	ppb
127-18-4	Tetrachloroethylene	<2.5	<4.2	<0.6

REMARKS: A 3M Brand Organic Vapor Monitor #3500 was used and was analyzed using techniques from NIOSH Physical & Chemical Analytical Method 1003 for charcoal tubes. The sampling rate used for the tetrachloroethylene quantitation was 28.3 cc/min with a recovery coefficient of 1.05 as provided by 3M.

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LABORATORY REPORT

TO: Dan McCaffery
ADDRESS: Envirocon, Inc.
P.O. Box 8243
Missoula, MT 59807

LAB NO.: 93-4634
DATE: 02/03/93 da

ORGANIC VAPOR MONITOR ANALYSIS

Monitor No.: WK 4695
Date Exposed: 01/12/93 @ 1705 to 01/26/93 @ 1715
I.D.: None
Temperature: N/A
Relative Humidity: N/A
Exposure Time: 20170 minutes
Sampled by: Dan McCaffery
Analysis date: 02/01/93

CAS No.	Constituent	µg/badge	µg/m^3	ppb
127-18-4	Tetrachloroethylene	11.4	19.0	2.8

REMARKS: A 3M Brand Organic Vapor Monitor #3500 was used and was analyzed using techniques from NIOSH Physical & Chemical Analytical Method 1003 for charcoal tubes. The sampling rate used for the tetrachloroethylene quantitation was 28.3 cc/min with a recovery coefficient of 1.05 as provided by 3M.

NOTE: Analytical value confirmed by GC/MS.

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LABORATORY REPORT

TO: Dan McCaffery
ADDRESS: Envirocon, Inc.
P.O. Box 8243
Missoula, MT 59807

LAB NO.: 93-4727
DATE: 02/03/93 da

ORGANIC VAPOR MONITOR ANALYSIS

Monitor No.:	WK 4530
Date Exposed:	01/13/93 @ 1315 to 01/27/93 @ 1655
I.D.:	None
Temperature:	N/A
Relative Humidity:	N/A
Exposure Time:	20380 minutes
Sampled by:	Dan McCaffery
Analysis date:	02/02/93

CAS No.	Constituent	μg/badge	μg/m^3	ppb
127-18-4	Tetrachloroethylene	<2.5	<4.2	<0.6

REMARKS: A 3M Brand Organic Vapor Monitor #3500 was used and was analyzed using techniques from NIOSH Physical & Chemical Analytical Method 1003 for charcoal tubes. The sampling rate used for the tetrachloroethylene quantitation was 28.3 cc/min with a recovery coefficient of 1.05 as provided by 3M.

NOTE: Analysis was confirmed by GC/MS due to sample matrix interference.

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LABORATORY REPORT

TO: Dan McCaffery
ADDRESS: Envirocon, Inc.
P.O. Box 8243
Missoula, MT 59807

LAB NO.: 93-4728
DATE: 02/03/93 da

ORGANIC VAPOR MONITOR ANALYSIS

Monitor No.: WK 4606
Date Exposed: 01/13/93 @ 1315 to 01/27/93 @ 1655
I.D.: None
Temperature: N/A
Relative Humidity: N/A
Exposure Time: 20380 minutes
Sampled by: Dan McCaffery
Analysis date: 02/02/93

CAS No.	Constituent	μg/badge	μg/m³	ppb
127-18-4	Tetrachloroethylene	<2.5	<4.2	<0.6

REMARKS: A 3M Brand Organic Vapor Monitor #3500 was used and was analyzed using techniques from NIOSH Physical & Chemical Analytical Method 1003 for charcoal tubes. The sampling rate used for the tetrachloroethylene quantitation was 28.3 cc/min with a recovery coefficient of 1.05 as provided by 3M.

NOTE: Analysis was confirmed by GC/MS due to sample matrix interference.

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LABORATORY REPORT

TO: Dan McCaffery
ADDRESS: Envirocon, Inc.
P.O. Box 8243
Missoula, MT 59807

LAB NO.: 93-4729
DATE: 02/03/93 da

ORGANIC VAPOR MONITOR ANALYSIS

Monitor No.: WK 4651
Date Exposed: 01/13/93 @ 1240 to 01/27/93 @ 1720
I.D.: None
Temperature: N/A
Relative Humidity: N/A
Exposure Time: 20440 minutes
Sampled by: Dan McCaffery
Analysis date: 02/02/93

CAS No.	Constituent	μg/badge	μg/m³	ppb
127-18-4	Tetrachloroethylene	6.1	10.0	1.5

REMARKS: A 3M Brand Organic Vapor Monitor #3500 was used and was analyzed using techniques from NIOSH Physical & Chemical Analytical Method 1003 for charcoal tubes. The sampling rate used for the tetrachloroethylene quantitation was 28.3 cc/min with a recovery coefficient of 1.05 as provided by 3M.

NOTE: The reported value was taken from GC/MS quantitation due to sample matrix interference.

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LABORATORY REPORT

TO:	Dan McCaffery	LAB NO.:	93-4730
ADDRESS:	Envirocon, Inc. P.O. Box 8243 Missoula, MT 59807	DATE:	02/03/93 da

ORGANIC VAPOR MONITOR ANALYSIS

Monitor No.: WK 4445
Date Exposed: 01/13/93 @ 1240 to 01/27/93 @ 1720
I.D.: None
Temperature: N/A
Relative Humidity: N/A
Exposure Time: 20440 minutes
Sampled by: Dan McCaffery
Analysis date: 02/02/93

CAS No.	Constituent	µg/badge	µg/m³	ppb
127-18-4	Tetrachloroethylene	11.3	18.9	2.8

REMARKS: A 3M Brand Organic Vapor Monitor #3500 was used and was analyzed using techniques from NIOSH Physical & Chemical Analytical Method 1003 for charcoal tubes. The sampling rate used for the tetrachloroethylene quantitation was 28.3 cc/min with a recovery coefficient of 1.05 as provided by 3M.

NOTE: Analytical value confirmed by GC/MS.

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LABORATORY REPORT

TO: Dan McCaffery
ADDRESS: Envirocon, Inc.
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Missoula, MT 59807

LAB NO.: 93-4731
DATE: 02/03/93 da

ORGANIC VAPOR MONITOR ANALYSIS

Monitor No.:	WK 4560
Date Exposed:	01/13/93 @ 1250 to 01/27/93 @ 1720
I.D.:	None
Temperature:	N/A
Relative Humidity:	N/A
Exposure Time:	20440 minutes
Sampled by:	Dan McCaffery
Analysis date:	02/02/93

CAS No.	Constituent	μg/badge	μg/m^3	ppb
127-18-4	Tetrachloroethylene	12.0	20.0	3.0

REMARKS: A 3M Brand Organic Vapor Monitor #3500 was used and was analyzed using techniques from NIOSH Physical & Chemical Analytical Method 1003 for charcoal tubes. The sampling rate used for the tetrachloroethylene quantitation was 28.3 cc/min with a recovery coefficient of 1.05 as provided by 3M.

NOTE: Analytical value confirmed by GC/MS.

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LABORATORY REPORT

TO: Dan McCaffery
ADDRESS: Envirocon, Inc.
P.O. Box 8243
Missoula, MT 59807

LAB NO.: 93-4732
DATE: 02/03/93 da

ORGANIC VAPOR MONITOR ANALYSIS

Monitor No.:	WK 4662
Date Exposed:	01/13/93 @ 1210 to 01/27/93 @ 1710
I.D.:	None
Temperature:	N/A
Relative Humidity:	N/A
Exposure Time:	20460 minutes
Sampled by:	Dan McCaffery
Analysis date:	02/02/93

CAS No.	Constituent	µg/badge	µg/m^3	ppb
127-18-4	Tetrachloroethylene	<2.5	<4.2	<0.6

REMARKS: A 3M Brand Organic Vapor Monitor #3500 was used and was analyzed using techniques from NIOSH Physical & Chemical Analytical Method 1003 for charcoal tubes. The sampling rate used for the tetrachloroethylene quantitation was 28.3 cc/min with a recovery coefficient of 1.05 as provided by 3M.

NOTE: Analysis was confirmed by GC/MS due to sample matrix interference.

ENERGY LABORATORIES

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LABORATORY REPORT

TO:	Dan McCaffery	**LAB NO.:**	93-4733
ADDRESS:	Envirocon, Inc. P.O. Box 8243 Missoula, MT 59807	**DATE:**	02/03/93 da

ORGANIC VAPOR MONITOR ANALYSIS

Monitor No.:	WK 4632
Date Exposed:	01/13/93 @ 1220 to 01/27/93 @ 1710
I.D.:	None
Temperature:	N/A
Relative Humidity:	N/A
Exposure Time:	20450 minutes
Sampled by:	Dan McCaffery
Analysis date:	02/02/93

CAS No.	Constituent	μg/badge	μg/m^3	ppb
127-18-4	Tetrachloroethylene	<2.5	<4.2	<0.6

REMARKS: A 3M Brand Organic Vapor Monitor #3500 was used and was analyzed using techniques from NIOSH Physical & Chemical Analytical Method 1003 for charcoal tubes. The sampling rate used for the tetrachloroethylene quantitation was 28.3 cc/min with a recovery coefficient of 1.05 as provided by 3M.

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February 16, 1993

Dan McCaffery
Envirocon, Inc.
P.O. Box 8243
Missoula, MT 59807

On February 8, 1993 these samples, represented by our laboratory numbers 93-5643 to 93-5650, were submitted to our laboratory for analysis.

The test results and quality assurance were reviewed and approved by the undersigned.

Reviewed by: ______________________

RECEIVED FEB 1 8 1993

COMPLETE ENVIRONMENTAL ANALYTICAL SERVICE

ENERGY LABORATORIES

ENERGY LABORATORIES, INC.
P.O. BOX 30916 • 1107 SOUTH BROADWAY • BILLINGS, MT 59107-0916 • PHONE (406) 252-6325
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LABORATORY REPORT

TO: Dan McCaffery
ADDRESS: Envirocon, Inc.
P.O. Box 8243
Missoula, MT 59807

LAB NO.: 93-5643
DATE: 02/16/93 ag

ORGANIC VAPOR MONITOR ANALYSIS

Proj. No. 140101. Livingston/BN

Monitor No.:	WK 4798
Date Exposed:	01/14/93 @ 1315 to 02/05/93 @ 0925
I.D.:	N/A
Temperature:	N/A
Relative Humidity:	N/A
Exposure Time:	31450 min
Sampled By:	DMC
Analysis Date:	02/11/93

CAS No.	Constituent	µg/badge	µg/m³	ppb
127-18-4	Tetrachloroethylene	<2.5	<2.7	<0.4

REMARKS: A 3M Brand Organic Vapor Monitor #3500 was used and was analyzed using techniques from NIOSH Physical & Chemical Analytical Method 1003 for charcoal tubes. The sampling rate used for the tetrachloroethylene quantitation was 28.3 cc/min with a recovery coefficient of 1.05 as provided by 3M.

ENERGY LABORATORIES

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LABORATORY REPORT

TO: Dan McCaffery
ADDRESS: Envirocon, Inc.
P.O. Box 8243
Missoula, MT 59807

LAB NO.: 93-5644
DATE: 02/16/93 ag

ORGANIC VAPOR MONITOR ANALYSIS

Proj. No. 140101, Livingston/BN

Monitor No.:	WK 4861
Date Exposed:	01/14/93 @ 1325 to 02/05/93 @ 0925
I.D.:	N/A
Temperature:	N/A
Relative Humidity:	N/A
Exposure Time:	31440 min
Sampled By:	DMC
Analysis Date:	02/11/93

CAS No.	Constituent	μg/badge	μg/m^3	ppb
127-18-4	Tetrachloroethylene	7.9	8.5	1.3

REMARKS: A 3M Brand Organic Vapor Monitor #3500 was used and was analyzed using techniques from NIOSH Physical & Chemical Analytical Method 1003 for charcoal tubes. The sampling rate used for the tetrachloroethylene quantitation was 28.3 cc/min with a recovery coefficient of 1.05 as provided by 3M. Analysis confirmed by GC/MS

ENERGY LABORATORIES

ENERGY LABORATORIES, INC.
P.O. BOX 30916 • 1107 SOUTH BROADWAY • BILLINGS, MT 59107-0916 • PHONE (406) 252-6325
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LABORATORY REPORT

TO: Dan McCaffery
ADDRESS: Envirocon, Inc.
P.O. Box 8243
Missoula, MT 59807

LAB NO.: 93-5645
DATE: 02/16/93 ag

ORGANIC VAPOR MONITOR ANALYSIS

Proj. No. 140101, Livingston/BN
Monitor No.: WK 4879
Date Exposed: 01/15/93 @ 1400 to 02/05/93 @ 1005
I.D.: N/A
Temperature: N/A
Relative Humidity: N/A
Exposure Time: 30005 min
Sampled By: DMC
Analysis Date: 02/11/93

CAS No.	Constituent	µg/badge	µg/m³	ppb
127-18-4	Tetrachloroethylene	<2.5	<2.8	<0.4

REMARKS: A 3M Brand Organic Vapor Monitor #3500 was used and was analyzed using techniques from NIOSH Physical & Chemical Analytical Method 1003 for charcoal tubes. The sampling rate used for the tetrachloroethylene quantitation was 28.3 cc/min with a recovery coefficient of 1.05 as provided by 3M.

ENERGY LABORATORIES

ENERGY LABORATORIES, INC.

P.O. BOX 30916 • 1107 SOUTH BROADWAY • BILLINGS, MT 59107-0916 • PHONE (406) 252-6325
FAX (406) 252-6069 • 1-800-735-4489

LABORATORY REPORT

TO: Dan McCaffery
ADDRESS: Envirocon, Inc.
P.O. Box 8243
Missoula, MT 59807

LAB NO.: 93-5646
DATE: 02/16/93 ag

ORGANIC VAPOR MONITOR ANALYSIS

Proj. No. 140101, Livingston/BN

Monitor No.:	WK 4930
Date Exposed:	01/15/93 @ 1415 to 02/05/93 @ 1015
I.D.:	N/A
Temperature:	N/A
Relative Humidity:	N/A
Exposure Time:	30000 min
Sampled By:	DMC
Analysis Date:	02/11/93

CAS No.	Constituent	µg/badge	µg/m³	ppb
127-18-4	Tetrachloroethylene	<2.5	<2.8	<0.4

REMARKS: A 3M Brand Organic Vapor Monitor #3500 was used and was analyzed using techniques from NIOSH Physical & Chemical Analytical Method 1003 for charcoal tubes. The sampling rate used for the tetrachloroethylene quantitation was 28.3 cc/min with a recovery coefficient of 1.05 as provided by 3M.

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LABORATORY REPORT

TO: Dan McCaffery
ADDRESS: Envirocon, Inc.
P.O. Box 8243
Missoula, MT 59807

LAB NO.: 93-5647
DATE: 02/16/93 ag

ORGANIC VAPOR MONITOR ANALYSIS

Proj. No. 140101, Livingston/BN
Monitor No.: WK 4715
Date Exposed: 01/15/93 @ 1430 to 02/05/93 @ 1020
I.D.: N/A
Temperature: N/A
Relative Humidity: N/A
Exposure Time: 29990 min
Sampled By: DMC
Analysis Date: 02/11/93

CAS No.	Constituent	μg/badge	$\mu g/m^3$	ppb
127-18-4	Tetrachloroethylene	<2.5	<2.8	<0.4

REMARKS: A 3M Brand Organic Vapor Monitor #3500 was used and was analyzed using techniques from NIOSH Physical & Chemical Analytical Method 1003 for charcoal tubes. The sampling rate used for the tetrachloroethylene quantitation was 28.3 cc/min with a recovery coefficient of 1.05 as provided by 3M.

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FAX (406) 252-6069 • 1-800-735-4489

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LABORATORY REPORT

TO: Dan McCaffery
ADDRESS: Envirocon, Inc.
P.O. Box 8243
Missoula, MT 59807

LAB NO.: 93-5649
DATE: 02/16/93 ag

ORGANIC VAPOR MONITOR ANALYSIS

Proj. No. 140101, Livingston/BN

Monitor No.:	WK 4683
Date Exposed:	01/22/93 @ 0915 to 02/05/93 @ 0912
I.D.:	N/A
Temperature:	N/A
Relative Humidity:	N/A
Exposure Time:	20160 min
Sampled By:	DMC
Analysis Date:	02/12/93

CAS No.	Constituent	µg/badge	µg/m^3	ppb
127-18-4	Tetrachloroethylene	4.5	8.2	1.2

REMARKS: A 3M Brand Organic Vapor Monitor #3500 was used and was analyzed using techniques from NIOSH Physical & Chemical Analytical Method 1003 for charcoal tubes. The sampling rate used for the tetrachloroethylene quantitation was 28.3 cc/min with a recovery coefficient of 1.05 as provided by 3M. Analysis confirmed by GC/MS.

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LABORATORY REPORT

TO: Dan McCaffery
ADDRESS: Envirocon, Inc.
P.O. Box 8243
Missoula, MT 59807

LAB NO.: 93-5650
DATE: 02/16/93 ag

ORGANIC VAPOR MONITOR ANALYSIS

Proj. No. 140101, Livingston/BN

Monitor No.:	WK 4857
Date Exposed:	01/22/93 @ 0915 to 02/05/93 @ 0915
I.D.:	N/A
Temperature:	N/A
Relative Humidity:	N/A
Exposure Time:	20157 min
Sampled By:	DMC
Analysis Date:	02/12/93

CAS No.	Constituent	µg/badge	µg/m³	ppb
127-18-4	Tetrachloroethylene	5.2	8.7	1.3

REMARKS: A 3M Brand Organic Vapor Monitor #3500 was used and was analyzed using techniques from NIOSH Physical & Chemical Analytical Method 1003 for charcoal tubes. The sampling rate used for the tetrachloroethylene quantitation was 28.3 cc/min with a recovery coefficient of 1.05 as provided by 3M. Analysis confirmed by GC/MS.

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FAX (406) 252-6069 • 1-800-735-4489

LABORATORY REPORT

TO: Dan McCaffery
ADDRESS: Envirocon, Inc.
P.O. Box 8243
Missoula, MT 59807

LAB NO.: 93-5648
DATE: 02/16/93 ag

ORGANIC VAPOR MONITOR ANALYSIS

Proj. No. 140101, Livingston/BN
Monitor No.: WK 4762
Date Exposed: 01/15/93 @ 1440 to 02/05/93 @ 1025
I.D.: N/A
Temperature: N/A
Relative Humidity: N/A
Exposure Time: 29985 min
Sampled By: DMC
Analysis Date: 02/12/93

CAS No.	Constituent	μg/badge	$\mu g/m^3$	ppb
127-18-4	Tetrachloroethylene	<2.5	<2.8	<0.4

REMARKS: A 3M Brand Organic Vapor Monitor #3500 was used and was analyzed using techniques from NIOSH Physical & Chemical Analytical Method 1003 for charcoal tubes. The sampling rate used for the tetrachloroethylene quantitation was 28.3 cc/min with a recovery coefficient of 1.05 as provided by 3M.

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LABORATORY REPORT

TO: Dan McCaffery
ADDRESS: Envirocon, Inc.
P.O. Box 8243
Missoula, MT 59807

LAB NO.: Blank
DATE: 02/03/93 da

ORGANIC VAPOR MONITOR ANALYSIS

Monitor No.:	WK 4311 Monitor Blank
Date Exposed:	N/A
I.D.:	None
Temperature:	N/A
Relative Humidity:	N/A
Exposure Time:	0.00 minutes
Sampled by:	N/A
Analysis date:	02/05/93

CAS No.	Constituent	μg/badge	μg/m³	ppb
127-18-4	Tetrachloroethylene	<2.5	N/A	N/A

REMARKS: A 3M Brand Organic Vapor Monitor #3500 was used and was analyzed using techniques from NIOSH Physical & Chemical Analytical Method 1003 for charcoal tubes. The sampling rate used for the tetrachloroethylene quantitation was 28.3 cc/min with a recovery coefficient of 1.05 as provided by 3M.

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LABORATORY REPORT

TO: Dan McCaffery
ADDRESS: Envirocon, Inc.
P.O. Box 8243
Missoula, MT 59807

DATE: 02/09/93 da

QUALITY ASSURANCE-SPIKED ANALYSIS

3M 3500 Monitor Badges were spiked with a known amount of Tetrachloroethylene with the following results:

	Spike Amount µg/badge	% Recovery
Badge #1	20	105
Badge #2	20	105
Badge #3	20	105

APPENDIX D

QUALITY-CONTROL INFORMATION

NARRATIVE REPORT

Berkeley Analytical Associates
904 Wright Avenue, No. 12
Richmond, CA 94804
510/236-2325
FAX 510/236-2335

Job Code: 06004
Report Date: February 6, 1993
Client: Envirocon, Inc.
Client Job Number: 140101, BN/Livingston
Analysis Type: GC-MS SIM, Quantitative Analysis of Tetrachloroethene

Report Approved By: R J Hodgson

Methods

The samples were collected on multisorbent samplers (Model ST-032, Envirochem, Inc.) which contain Tenax-TA, Carboxen carbon molecular sieve and activated charcoal in series. These samplers have been validated for the collection of air toxic compounds by Broehler *et al.* (1990).

An authentic standard of the target compound, tetrachloroethene (PCE), was obtained from Aldrich Chemical Company, Inc. Gas standards were prepared from the liquid standard using the U.S. EPA static dilution bottle method. A multi-point calibration for PCE was run on the day that samples were analyzed.

The samplers were analyzed for PCE by thermal desorption-gas chromatography-mass spectrometry. The thermal desorption-sample concentrator unit is a UNACON Series 810 (Envirochem, Inc.) The mass spectrometer was operated in the selected-ion monitoring (SIM) mode to maximize the selectivity and sensitivity of the analysis.

The quality assurance program used for the analysis for volatile organic compounds is described in the document, BAA-SOP-92.01. Standard operating procedures describe all aspects of sampler conditioning, storage and analysis.

Results

The quantitative results for the samplers are given in Report MASS167. The lower limit of quantitation for PCE was established at 0.5 ng, or about 0.2 ug m^{-3} for a 3-L sample. Both the system and field blank values were below the limit of detection. The concentrations of PCE in the field samples (ug m^{-3}) were calculated using the sample volumes reported in standard liters. These concentrations ranged from 0.2 - 10.2 ug m^{-3}.

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P.O. BOX 30916 • 1107 SOUTH BROADWAY • BILLINGS, MT 59107-0916 • PHONE (406) 252-6325
FAX (406) 252-6069 • 1-800-735-4489

CASE NARRATIVE AND ANALYTICAL RESULTS
FOR
3M 3500 MONITOR BADGE ANALYSIS

prepared by

ENERGY LABORATORIES, INC.
P.O. BOX 30916
1107 SOUTH BROADWAY
BILLINGS, MT 59107

prepared for

ENVIROCON, INC.
P.O BOX 1154
LIVINGSTON, MT 59047

COMPLETE ENVIRONMENTAL ANALYTICAL SERVICE

FEB 11 1993

Case Narrative

Envirocon monitor badge samples from BN/Livingston project #140101 were received on January 27 thru January 29, 1993. They are represented by our lab numbers 93-4514 thru 93-4538, 93-4599 thru 93-4634 and 93-4727 thru 93-4733. Chain of Custody procedures were maintained with all samples. The 3M monitor badges were analyzed using protocol taken from NIOSH Physical and Chemical Analytical Method 1003 for charcoal tubes. Holding times were maintained for all samples.

Three method blanks consisting of non exposed monitor badges taken randomly from the lot of badges provided for the project were analyzed with the sample sets. In addition, three non exposed monitor badges were spiked with a known amount of target analyte and analyzed with the sample sets to insure that the calibration curve and desorption efficiency were in control. All analytical results were within recommended quality control limits.

Because of the low concentrations being monitored, many of the monitor badges contained background volatile organic compounds (VOC's) that interfered with the identification and quantitation of the target analyte, tetrachloroethylene. The background contaminants could be present from many household items and from outgassing from furniture, building materials, etc. As a result, all target hits reported were confirmed by mass spectral identification using GC/MS as opposed to the relying solely on retention time confirmation as specified in the NIOSH method. Where the non-target compound interference was shown to be co-eluting with the target analyte, GC/MS quantitation was used. By quantitating using an ion unique to the target analyte, background interference was completely eliminated. The only exception was lab no. 93-4514. Because of a faulty septum cap, the excess extraction solvent from the monitor badge normally saved for reruns evaporated, precluding confirmation by GC/MS. The original GC/FID analysis for this badge showed no indication of background interference problems.

All raw data including mass spectral confirmation is preserved and available for inspection at our Billings facility.

William T Brown

William T. Brown.
Chief Organic Chemist, Energy Laboratories, Inc.

Table D-1
Blank Sample Results

SAMPLE	PCE Mass
BERKELEY MULTISORBENT TUBE	[ng/tube]
system blank	< 0.5
field blank # 065	< 0.5
3-M PASSIVE DOSIMETER	[ug/badge]
WK 4805	< 2.5
WK 4763	< 2.5
WK 4311	< 2.5

Table D-2
Duplicate Sample Results

LOCATION	PRIMARY SAMPLE NO.	DUPLICATE SAMPLE NO.	PRIMARY Concentraton PCE [ug/M^3]	DUPLICATE Concentration PCE [ug/M^3]	RELATIVE % DIFFERENCE (RPD)
BERKELEY MULTISORBENT TUBE					
AMB-3	#032	# 051	4.7	4.6	2%
3-M PASSIVE DOSIMETER					
NE-9	WK 4786	WK 4776	< 4.2	< 4.2	N/A
NE-17	WK 4445	WK 4560	18.9	20.0	6%
SE-5	WK 4847	WK 4694	< 4.2	< 4.2	N/A
SE-17	WK 4649	WK 4450	4.5	4.5	0%
SE-27	WK 4766	WK 4448	< 4.2	< 4.2	N/A
SE-29	WK 4606	WK 4530	< 4.2	< 4.2	N/A